No. 1865 Vol. XLVI SEPTEMBER 21st, 1944

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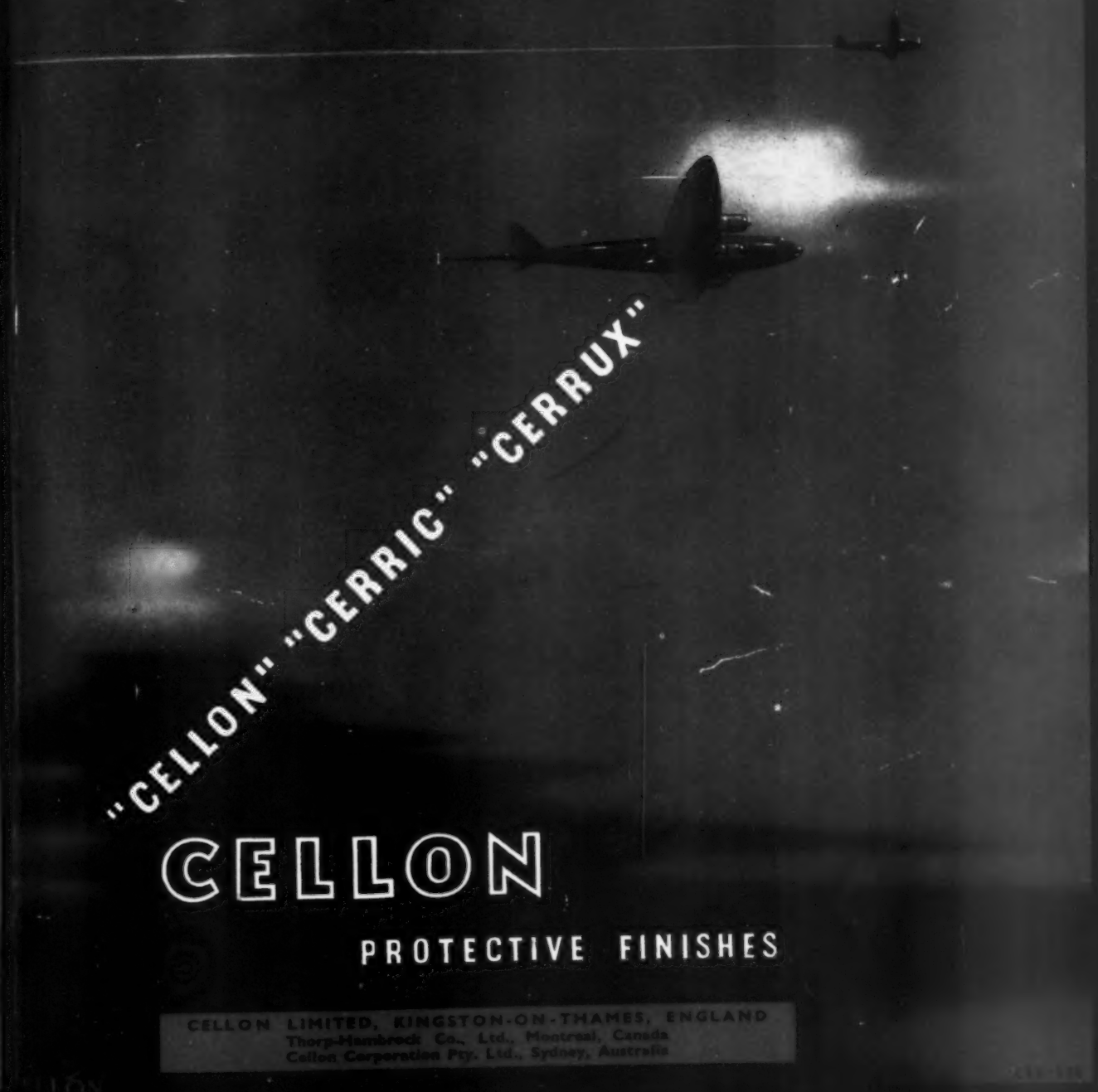

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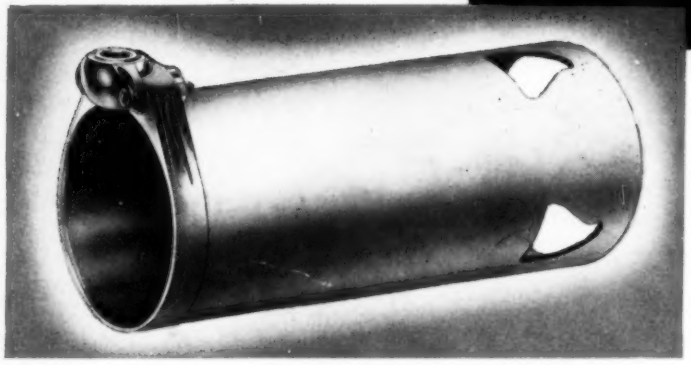

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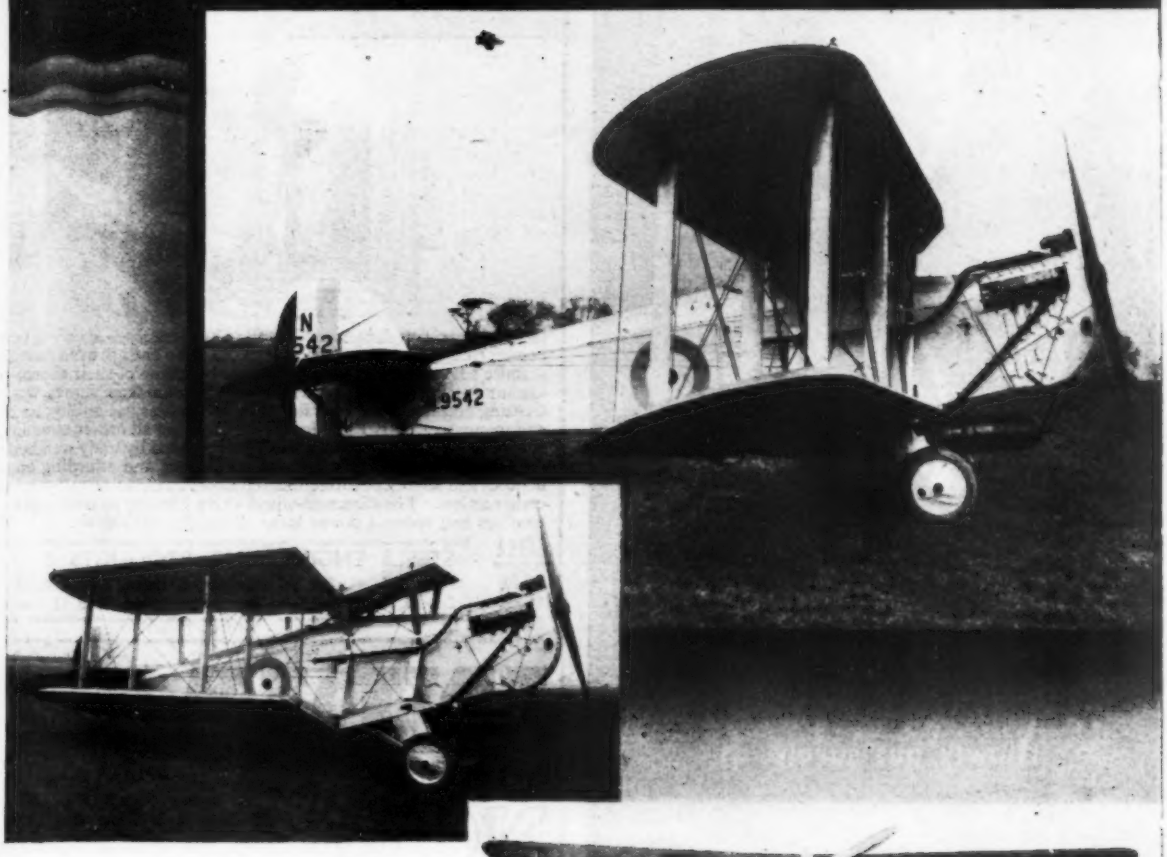

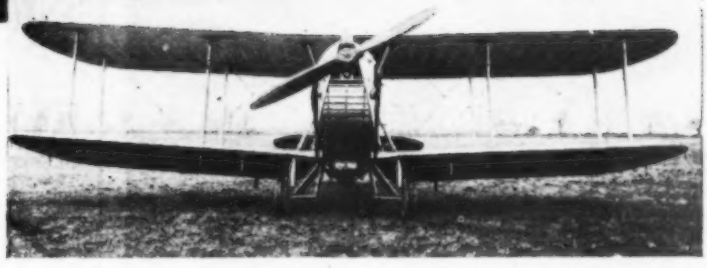

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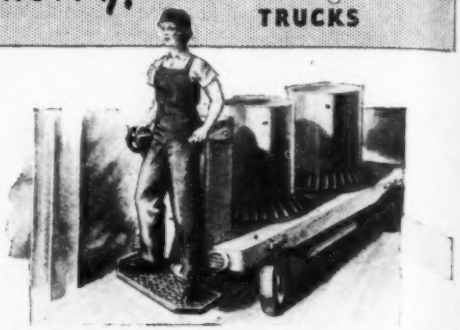

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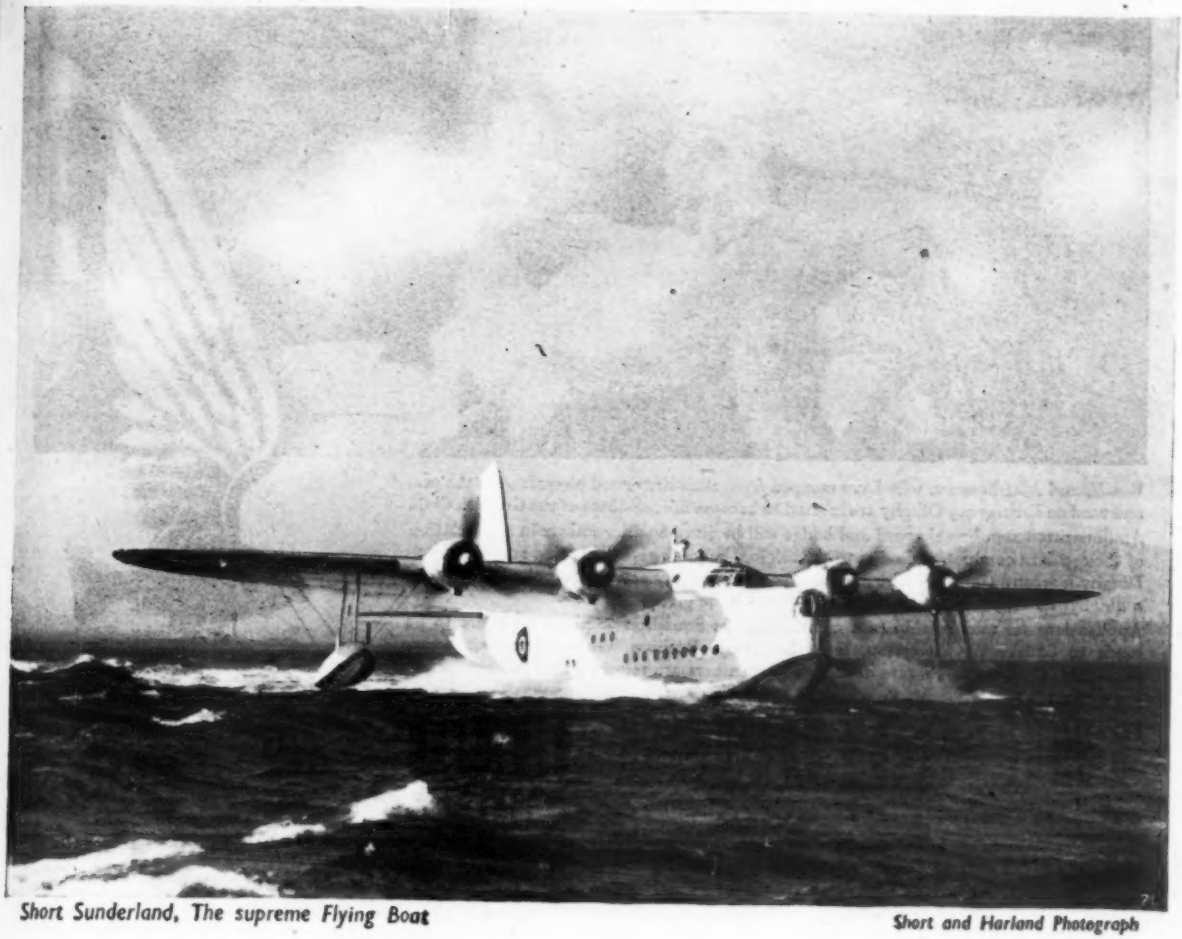

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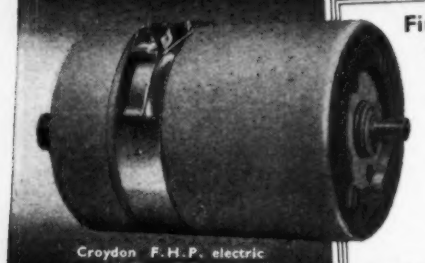

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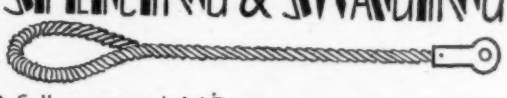

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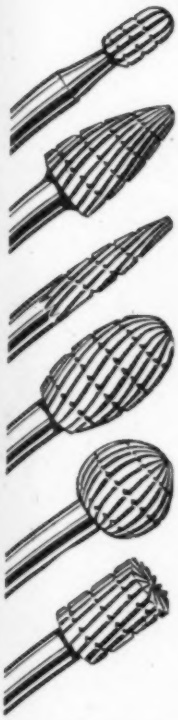

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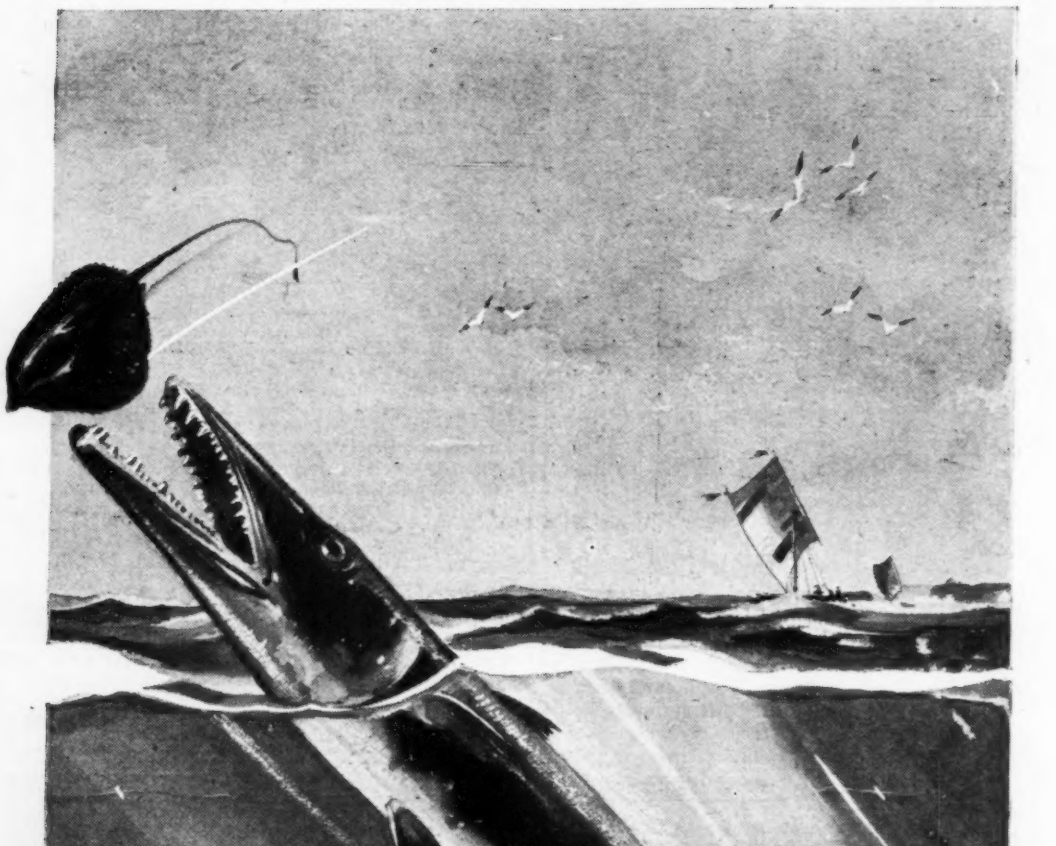
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The Outlook

Aircraft and the Lull

MANY writers of authority have pointed out that modern war is largely a matter of lines of communication. That means getting supplies up to the fighting front. The faster the advance, the more difficult is the supply problem. The speed of the great Allied dash from Normandy, round Brittany, into Belgium and across the German border was bound to be slowed up some time or other by the need to replenish supplies immediately in the rear. The Germans recognised this clearly enough, and ordered their garrisons in the Channel ports to hold out as long as possible. Le Havre was the first really useful port to surrender, and its capture must soon immensely ease the supply situation.

The slowing-up of the armour did not affect the air power of the Allies. There is a sufficiency of petrol and other necessaries in Britain. The question which may have worried some students was how the Air Forces would be used during this comparative lull. Had the lessons of the past been learnt and digested? It still rankles to reflect that in 1918, when we were tentatively experimenting with air power, we risked losing the last great land battles while we sent an Independent Air Force to drop a few small bombs on the cities of the Rhineland; and again in 1939-40 that Bomber Command dropped leaflets over Germany while the troop trains were bringing German divisions from the Eastern to the Western Front and the Siegfried line was being fortified.

But, thanks be to Providence, brains now animate the use of our air power. Bomber Command first contributed to the fall of Le Havre. As the British G.O.C. wrote to Air Chief Marshal Sir Arthur Harris, the bombers dropped 5,000 tons "just as the Army wanted it."

Then Sir Arthur Harris and General Spaatz turned to the other targets which really mattered. At such a crisis there would be little point in striking at general war production, for it takes some months for the effect of such blows to be felt on the battlefield. Raids which forced the depleted *Luftwaffe* to send up fighters were useful, and several such raids resulted in Germany losing hundreds of her fighters. Very many were also destroyed on the ground.

The two items most likely to affect the German power of resistance in the next series of battles were oil and railway communications. From all sides the Allied bombers struck by night and by day at oil installations, and they also bombed the crowded railway junctions. Frankfurt station was known to be crammed with military supplies on the way to the Siegfried line, and 400,000 fire bombs were dropped on them. It was the first tactical (as apart from strategical) raid on that place.

These operations will surely expedite the day when the washing will at long last be hung out to dry.

Only One Service?

IN the current issue of the paper *Air Mail*, which is the journal of the Royal Air Force Association, once known as Comrades of the Royal Air Force, there is a very thoughtful article entitled "Island Power." In it the anonymous writer emphasises the interdependence of the three Fighting Services, and pleads for more common thought between them all.

The ideal, he writes, may be to amalgamate the three existing Services into one fighting force, operating under one Chief of Staff and wearing the same uniform. But he admits that we should be unwise to force the pace unduly, for we have to do with human nature, and human nature, especially in England (he might

with advantage have said the United Kingdom) does not take kindly to violent change.

He advocates, however, an early start by giving a common education to all potential officers both of the Fighting and the Civil Services. The education of officers after commissioning could be broadened by establishing combined Staff and War Colleges at appropriate levels, and we could thus produce Commanders and staffs with full knowledge of what they are about and of the capabilities and suitability of the various components of the force in the roles allotted to them in the combined plan.

One of the most striking novelties introduced in the present war has been the appointment of Supreme Commanders in various theatres who have been granted power to direct the strategical employment, and in some cases the tactical employment, of all three Services.

Obviously each officer must be trained (at least in the early stages of his career) as an expert at one particular form of fighting. One could never expect, say, a Flying Officer to make an efficient commander of a destroyer, or a Captain in the Royal Armoured Corps to be a good leader of a flight of R.A.F. fighters. But the organisation of the Army suggests that more could be done in that line than at first sight seems likely. A lieutenant in the infantry probably knows very little about the work of artillery, engineers, or tanks. Yet when he has risen to be a General Officer he is considered fit to command a force of all arms. The fighting in Burma is at present almost entirely infantry work, yet we trust Admiral Mountbatten to direct it.

It would be rash to express a definite opinion yet on this very controversial subject; but certainly the more that every officer knows about the work of Services other than his own, the better it will be for the future security of the British Isles.

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Airborne Division

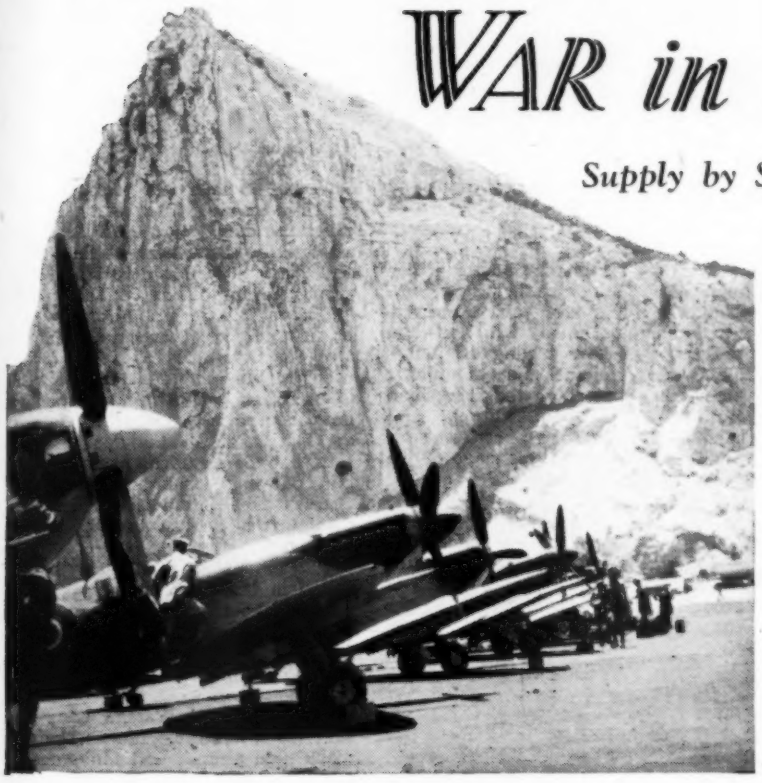
WHAT a pity it is that Sir Nigel Norman could not have been spared to enjoy the magnificent spectacle of the first large-scale operation by the Airborne Army last Sunday when it made its descent on Holland in terrific force. Sir Nigel shared with General Browning the honour of training the first Airborne Division in the British Forces, and it is legitimate to assume that out of that partnership sprang much of the excellence of Sunday's operation. Sir Nigel lost his life in a flying accident, but happily General Browning is still playing a leading part as second-in-command to the G.O.C., Lt.-Gen. Brereton.

Sunday's air invasion was a truly combined operation. The whole might of the Allied Air Forces in Western Europe co-operated; light bombers, heavies, fighters and fighter-bombers played their part, and Dutch patriots contributed once the airborne forces had landed.

OVER THE RHINE: Halifaxes, with their Horsa gliders of the First Allied Airborne Army, crossing the river which the Germans have lauded in song, music and verse since time immemorial. A short account of the landing, from our own war correspondent, is on page 305. A much fuller account will appear in our next issue.

WAR in the AIR

Supply by Sea and Air : Tactical Bombing in Excelsis : British and U.S. Methods of Air Support



TOWERS OF STRENGTH : Seafire IIIs of the Fleet Air Arm being serviced at the North Front airfield in Gibraltar. At night the airfield is floodlit by lights concealed in the rock face.

CHERBOURG is a port of value on the northern coast of France, but as the Allies moved eastward at a pace unprecedented in the history of war it became urgently necessary that they should seize a port not far from their front line. Le Havre was the first to fall, but at the time of writing it is uncertain how long it will take to make the harbour usable. The heavy attack by Bomber Command may be presumed to have fallen on the German forts rather than on the harbour, but the Germans themselves usually try to demolish as much as they can in a town which they know they can no longer hold.

In the meantime the advance of the armour of Gen. Eisenhower had to pause, waiting for supplies. A whole fleet of Dakota transport aircraft was immediately set to work to fly to and fro, carrying as much as possible of the stuff which the armies needed. The organisation of this air supply line was a very fine piece of work, but sea transport, slow though it may be, is still the bedrock of the supply system for the Army. Even railways, which are faster, and in the working of which there is no lack of experience, cannot compete in utility with sea transport. The day is far distant when air transport (using the fastest of all the carriers) can be counted as a rival to shipping and railways. Nevertheless, as an emergency measure, this use of the Dakotas was highly to be praised.

Aircraft did not only drop bombs on Le Havre and the other Channel ports. They also dropped leaflets and (a very clever idea) safe-conduct passes which must have been very tempting to German soldiers who knew there was no chance of relief or escape for them. Fear and depression are very infectious complaints, and, while many German bodies are fighting stubbornly, others are only too glad to surrender. The number of prisoners taken by the Allies since the landings in Normandy and the Riviera must have made a very considerable diminution in the total German strength, without counting all the slain and the wounded who were got away.

The meeting and joining of hands between the Army of Gen. Patton and the 7th Army from the south is one of the marvels of this remarkable campaign in France. The distances covered were enormous, and the time taken to cover them was very short. This result was due to the speed of mechanised armies. In neither advance does the air seem to have played much part, since the carrier aircraft covered the original landings in the Riviera. Neither force has had to worry about opposition from the *Luftwaffe*, and, with the F.F.I. providing any amount of accurate information about the positions of the German forces, there cannot have been much need even for reconnaissance aircraft. No doubt both forces would have liked to have some rocket-firing Beaufighters with them to deal with enemy tanks, but none the less they have never been unduly held up. A series of battles devoid, or almost devoid, of aircraft must have seemed strange to modern Generals.

NO ROOM TO SWING : L.S.T.s (Landing Ships, Tank) are now competing with the baby flat tops. A portable landing strip is carried and eight aircraft can be stowed on board. They were used in their new role during the invasion of France.

WAR IN THE AIR

Besides bombing the defence of Le Havre, Bomber Command has been attacking oil installations and railway centres. The 8th Air Force of Gen. Spaatz in Britain, and his 15th Air Force in the Mediterranean have been joining in the attack on the enemy's oil supplies. Now that Ploesti has been captured by the Russians, every ton of oil is precious to the German forces. Over some places German fighters resisted with determination, and some hundreds of them have been destroyed in the last week. The morale of German civilians is not yet a factor which can have much effect on the lengthening or shortening of the war; but for what it is worth it must find air raids far more trying to bear now that there is no news coming in of the German armies conquering distant countries. German civilians must all know now, or will do soon, that the Allies in the West have crossed the German frontier, while the Russians are knocking at the door of East Prussia.

Gen. Eisenhower has broadcast to foreign workers in the factories in Germany, saying "You are in danger." One rather expected that this would be followed by a threat of more bombing. Instead, it told the enslaved workers that Himmler would send them to man the fortifications, as he had done on the Eastern front, and Gen. Eisenhower advised them all to clear out into the fields and seek work on the farms.

In truth, the time for bombing German war factories must be nearly over. That was a long-term policy, and the war is now concerned with short-term policies, especially cutting off immediate reserves of fuel and ammunition before they can reach the firing line. Dumps, store depots, railways and canals—these are the proper targets for the Allied bombs at this stage of the war.

U.S. Air Support

IT is interesting to learn that the Americans in France are adopting an organisation for air support of ground troops which resembles the early German organisation rather than the British methods. Individual columns of American armour are allotted flights of Thunderbolts to work with them and clear away obstructions, much as the Stukas worked with the Panzers in 1939-40. The British method is to keep the whole of the 2nd Tactical Air Force available to help any ground troops which need aid. One reason for the difference may be that the American air squadrons are part of the Army, and there is therefore nothing incongruous in an officer on the ground issuing orders to the aircraft. The R.A.F., on the other hand, is a Service separate from the Army, and though both are under the Supreme Commander, the Army officers have no power to issue orders to those of another Service. Perhaps also the fact that the American armour is fanning out in so many different directions makes it advisable for each column to be accompanied by its own air unit.

The submission of Bulgaria has resulted in the liberation of 335 Allied airmen who were prisoners of war in that country. They were stated to have been badly treated and to have been found in a dirty and verminous condition.

The patriots in Warsaw have been suffering a miserable time. The Germans used aircraft and tanks against the parts of the city which they held, and the arms dropped by British aircraft only alleviated a desperate position. Naturally, those arms could only be of the small arms category. They were very valuable, but not of the calibre which would stop tanks. However, as the Russians advanced their fighters engaged the Germans over the city, and that brought some relief to the hard-pressed patriots.

Good Photography

A VERY fine piece of work has been accomplished by the U.S. 9th Air Force. It has photographed the whole of the Siegfried Line and much of the territory behind it. In 1939 the Blenheims of the Air Component made a complete photographic survey, but since then changes have taken place. For years the line of fortifications must have been allowed to rust, but lately it has been feverishly taken in hand again. The Americans only lost one machine in the process, and 200,000 prints were handed over for the staffs to study. The advancing American columns have not waited for a complete examination of the prints, but went ahead and dinted the line in several places.

The Germans have evacuated the large island of Mytilene, once known as Lesbos. The troops must have been very glad to go, though whether they will still be in time to reach the Fatherland, or will be cut off and captured by Greek bands, Tito's forces, or the Russians who are now pouring west and south through Rumania and

FRIED FISH: (Top) A Fairey Barracuda, with its engine on fire, lands-on after the Tirpitz action and runs into the crash barrier. Bits of the airscrew are flying in the air. (Bottom) The crash party swarm over the deck and put the fire out.

WAR IN THE AIR

Bulgaria remains to be seen. Most of the Ægean islands had German garrisons, and, if shipping is available, probably most of those garrisons will try to escape. But even before they reach the mainland they will have to run the gauntlet of the aircraft of the Middle East, which have been showing increasing activity over the Ægean of late.

At noon on Sunday, September 17th, strong forces of the 1st Allied Airborne Army landed in the Rhine delta area of Holland, so striking at the right flank of the whole German defence line in the west. This operation was the first employment of Lt. Gen. Brereton's recently formed command, and was the greatest airborne venture ever to have been attempted, and it is good to see that the whole colossal undertaking appears to have developed exactly as hoped by those who planned it. Gen. Brereton's two air commanders, Maj. Gen. Williams and Air Vice Marshal Hollinghurst, personally led in their troops and directed the operations.

The way was prepared by the Allied Air Forces when, late on Saturday afternoon, Havocs and Marauders of the U.S. 9th Air Force bombed dykes, possibly to make floods to hinder enemy movement. Later in the evening Lancasters and Mosquitoes attacked airfields at Leevarden and Steenwijk in Holland, and Salzbergen and Hopsten in Germany. Following these attacks 100 R.A.F. bombers struck at Dortmund, Brunswick and Moordijk.

Immediately before the landings were made, large forces of R.A.F. Second Tactical Air Force machines and heavy bombers of the U.S.A.A.F. attacked enemy gun positions over a wide area. The general devastation of these gun positions served the additional purpose of wiping out opposition to the advance of the ground forces' tanks.

More than 1,000 aircraft were employed in this airborne operation, but what the proportions of tugs and gliders and escort aircraft were has not yet been revealed. Horsas and American C.G.4 gliders were used, their tugs being Stirlings, Halifaxes and Dakotas, but, in addition to the glider-borne troops, a tremendous force of paratroops was dropped, mostly from Dakotas, although other aircraft were employed for this purpose, as indicated by the report of a navigator who mentions that both bombs and paratroops were dropped from his machine.

The landings are reported by the enemy to have been made at Nijmegen, on the Rhine, and only three miles from Germany; at Tilburg, on the Wilhelmina Canal, and the main southern trans-Holland railway; and at Eindhoven, which is but ten miles over the Belgian-Dutch border, and is both a road and main rail junction.

It appears that the co-ordination of the air invasion with the operations of the ground forces has successfully struck at one "fell swoop" a very large wedge into the German forces in Holland, and those key production centres of Cologne, Dusseldorf, Duisburg, Mulheim, and Essen are in far more imminent peril to-day than they were before this fateful week-end.

OVER THE RHINE

From Our Own Correspondent Who Flew With the First Allied Airborne Army

TRULY a great operation. All the planning and all the training of thousands of men put into the sky in a matter of an hour or two. From the take-off of solitary pairs of tugs and gliders, to the immense concentration of air power over the dropping zones—bombers, fighter-bombers, fighters, tugs, gliders and paratroops—the build-up was an example of perfect timing.

We took off on a lovely Sunday morning as the autumn morning mist was rising and forming into stratocumulus clouds. The whole staff of the airfield lined the perimeter track to watch us get away. The padre came along the line of Stirlings with the odd word for the aircrews, and W.A.A.F.s watched with anxious eyes the departure of many of their friends into the unknown hazards of war.

As time went on, each pair of Stirlings taxied from their close marshalling point on the perimeter track on to the runway. Behind each one a tractor pulled up the next Horsa glider in order, and the tow-ropes were attached. At last, after what seemed hours of waiting, it was our turn next. A signal from the Flying Control officer and the throttles of the four great Hercules of our Stirlings were opened as we ran down the long runway. The glider at the rear holds the tug back, and we are very near to the end of the runway before we are clear of the ground.

Timing is one of the essentials of an operation of this nature, so we went straight on from our airfield to turn over the Bristol Channel and join the stream in our proper order and place.

The sky and clouds were a delight to watch, but this beauty was a bugbear to the gliders. Turbulent currents, always associated with cumulus clouds, threw the gliders up and down, sometimes getting them into the slipstream of the tugs. The resulting fight to get back into proper station is frequently the cause of tow-ropes breaking.

As we approach Holland a considerable amount of stratus cloud is met and our stipulated height takes us just in and out of the ragged bottoms. Now events and things crowd in on the mind. Fighters look after us above. Below, for the first part of the journey, all is peaceful. The good Hollanders returning from church stand in little groups in the roads and wave as we go over—so low are we that this can be seen distinctly. Now, stretching for miles, are thousands of acres of good farmland which the Germans have flooded. The little red houses are the only things sticking out of the water. What happened to the cattle and livestock one can only guess.

Things get hotter. *Flak* can be seen in several directions. The under-cover of fighter-bombers is on the job. I saw a little *flak* from an A.A. barge and, almost immediately, a Spitfire was spraying it with cannon shells. In a matter of seconds it was alight.

Over the battle area now, with fires in all directions. The D.Z. (dropping zone) comes into sight and the glider pilot is called up on the inter-com. "Hullo No. 2, I will tell you when the glider in front pulls off." Then to the rear gunner—"Get the Aldis lamp ready." (He gives the actual signal when it is time to break away.) "Hullo No. 1," comes the voice of the glider pilot, "Thanks for the tow. Hope you get home safely." "Thank you No. 2. Good luck."

A flash of the lamp and "Glider gone" comes from the rear, and at the same time nine ugly puffs of 40 mm. *flak* appear but a few yards ahead. A slight turn to port and another six puffs appear exactly where we would have been but for the turn. A sharp smack is heard as something hits the Stirling—then "Tow-rope gone" and with a sharp turn to port back over the Rhine, we head for home. There, down on the ground are hundreds of gliders from which thousands of super-trained men have disembarked to play havoc with the German right flank.

A quick climb up above the gathering clouds where we formate with the squadron commander, flying in X for X-ray, and all is peaceful once more as we return with another 50 m.p.h. showing now we have no glider to tow.

HERE AND THERE

Promotion

GROUP CAPT. FRANK WHITTLE, C.B.E., has been promoted to the rank of acting Air Commodore, and, in making this announcement, the Air Ministry states he is to remain on the Special Duty list with Power Jets, Ltd.

It's a Gift

HAILE SELASSIE, Emperor of Abyssinia, has been presented with a Cessna aircraft by the U.S. It is the first of four to be delivered under a Lend-Lease arrangement.

Education Chief Retires

AIR COMMODORE W. M. PAGE, Director of R.A.F. Educational Services since 1936, retired recently. After a distinguished academic career at Cambridge, he served for some years as H.M. Inspector of Schools and was appointed education adviser to the Air Ministry in 1929.

He is a former Fellow of King's College, Cambridge, and is on the governing body of Charterhouse.

Belgian Airway to Congo

A MONTHLY Belgian air service between Britain and Leopoldville, capital of the Belgian Congo, has just started, says the Belgian News Agency.

The service, which will be worked by Lockheed Lodestar aircraft, will carry passengers and mail.

This is Belgian civil aviation's first step to reopen the airline between Belgium and the Congo which was run before the war.

Dakotas Feed Second T.A.F.

A GREAT "air pipeline" is being used to maintain the Allied Air Forces operating with the ground forces from the most forward airfields in Belgium.

Huge fleets of Dakotas are being used to supply the forward squadrons with hundreds of thousands of gallons of petrol, bombs, rockets, ammunition and the hundred and one other things needed to keep T.A.F. airborne.

Burma Appointment

IT was officially announced in Kandy last week that Air Marshal W. A. Coryton, who taught the King to fly after the last war, has succeeded Air Marshal Baldwin in command of the Third Tactical Air Force. Air Marshal Coryton, who is 49, began his flying career in 1917 with the R.F.C.

On his departure, Air Marshal Baldwin was decorated with the Air Medal by General Stratemeyer, Allied Air C.-in-C., South-East Asia, for flights in unarmed and unescorted aircraft over Burma.

U.S. Air Appointment

BRIG. GEN. LAURIS NORSTAD has been appointed Chief of Staff of the 20th U.S. Air Force with headquarters at Washington, in succession to Brig. Gen. Haywood S. Hannsell, jun., who has been given an undisclosed overseas command.

General Norstad, who has been Director of Operations, Plans and Intelligence for the Mediterranean Allied Air Force, assisted in planning the aerial campaign for the North African landings in 1942, and for the Sicilian and Italian campaigns.

Exhortation

SPEAKING at a Battle of Britain commemoration service held by the R.A.F. in New Delhi, Air Chief Marshal Sir Richard Peirce, A.O.C.-in-C. South-East Asia Command, said that the Allied Air Forces were beating the Japanese out of the skies, and he added that an even greater effort was expected from everyone during the coming months.

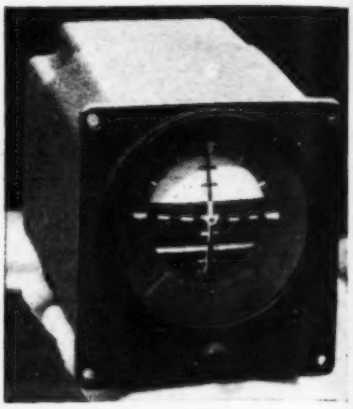
"I appeal to everyone to ensure that the treacherous and barbarous enemy who tried to stab peace-loving countries in the back suffers humiliation and utter defeat," he concluded.

HE KEPT HIS SEAT: An 8th Air Force fighter pilot expresses surprise at the *flak* hole in the flank of his Mustang — to the amusement of his staff-sergeant mechanic. By a miracle of luck he was unscratched.

Air Ferries

THE first transportation co-operative society to be established in the United States or Canada, has been founded on the Magdalen Islands, in the middle of the St. Lawrence Gulf. The concern has 350 members each holding small shares, and recently began operations.

The articles of Association permit the group to operate all kinds of transport, and immediate plans envisage a fleet of aircraft, buses and boats to accept passengers, mail and freight, carrying between the islands and Nova Scotia, Prince Edward Island, Cape Breton and Quebec.



BLIND-FLYING AEROBATICS: The new Sperry attitude gyro is claimed to make possible for the first time all aerobatic manoeuvres without reference to the earth's surface. It gives attitude indications visual throughout 360 deg. of roll and pitch, and the weight is only 4·25 lb. The attitude gyro is electrically driven and runs at 23,000 r.p.m.

Air Transport Activity

COLONEL LUTHER HARRIS, commander of maintenance and engineering for the U.S. Army's Air Transport Command, declared in a broadcast that A.T.C. aircraft are crossing the Atlantic at the rate of one every 22 minutes and the Pacific every hour and 42 minutes, and are scaling the Himalayas into China every 10 minutes.

The colonel revealed that in one recent month A.T.C. delivered more than 65,000,000 lb. of vital cargo to the various fronts. He said returning aircraft brought back more than 10,000 wounded during the first half of 1944.

Keeping supplies going to China and India is the "toughest route of all," he said, but A.T.C. in one recent month made more than 4,500 trips.

For the Pacific War

LOCKHEED AIRCRAFT CORPORATION, at Burbank, California, is launching a construction programme of more than $13,000,000 (about £3,250,000) to increase production for the Pacific war.

Mr. Robert Gross, President of the Corporation, stated that $9,000,000 (about £2,500,000) alone would be spent this autumn on new machinery, all to be manned by new workers.

A million-dollar (£250,000) hangar fully equipped for the modernisation and

HERE AND THERE

major overhaul of military aircraft serving in all the Pacific theatres, is included in the firm's expansion programme.

F.F.I. Air Squadron

THE F.F.I. have formed their first air squadron, consisting of 18 aircraft, which is led by the well-known French airman, Doret, said Radio France (Algiers), quoted by Reuter.

The squadron has already carried out more than 35 reconnaissance flights, keeping a close watch on the whole region south of the Loire.

Ten mechanics and four fitters who had previously served under Doret trained the crews.

Douglases Down Under

AUSTRALIAN NATIONAL AIRWAYS have ordered 16 Douglas airliners, with spare equipment, at a cost approaching £3,000,000.

Eight of the aircraft will be DC-3s, four of them DC-4s and the remaining four DC-6s, and deliveries are to begin "as soon as circumstances permit."

Overseas services are included in the company's plans, subject to the approval of the Australian Government, if and when the international situation permits.

Co-operation

ALL flying interests in Leicester have been brought into one camp by the formation of the Leicester Aviation Centre, which came into being at a recent meeting called by the Air League. Sir Arthur Haselrigg presided and was supported by Sir Lindsay Everard and Air Comdre. Sir Adrian Chamier. The object is to foster all branches of civil aviation.

Officials of the new organisation were mainly elected from A.T.C. officers of the Leicester Wing, and sub-committees are to be set up to handle the various phases of flying activity, such as power-flying, gliding and soaring, and model aircraft.

V2 "Probable"

LORD DUDLEY, Midland Regional Commissioner, speaking of the relaxation of the blackout, Civil Defence duties, and fire-watching, said at Birmingham recently: "It is possible, even probable, that the enemy will be able to launch something else at a longer range and of a different type from V.1. Therefore, it is necessary for us to be on our guard. We must maintain full efficiency so as to be able to bring our defensive measures into operation at a moment's notice."

It may be mentioned, in this respect, that the R.O.C. and the air-raid warning system still remains fully operative.

Air Rights in Ethiopia

AMERICAN AVIATION DAILY contradicts newspaper reports that Britain has been given exclusive rights for commercial aircraft flights over Ethiopia.

"The reports stated that such rights were secured in the 1942 agreement," it says. "Officials here admit that the reading of the agreement would indicate exclusive rights for Britain. They point out, however, that shortly after the agreement was signed, Britain informed the U.S. that the agreement would not be exclusive in character, and that it would not preclude the U.S. from obtaining aviation rights in Ethiopia if U.S. companies wished to operate there."

"We regret to announce that, owing to a slight technical hitch, one of our pilotless planes returned to its base early this morning."

Ships and Gulls

THE Newcastle-on-Tyne shipping firm of Hunting and Son, Ltd., has acquired the Percival Aircraft Co. at a purchase price stated to be "in the neighbourhood of £180,000."

Mr. P. D. Ackland is to continue as managing director, but Mr. P. L. Hunting will be the new chairman and will be joined on the board by his brother, Wing Cdr. G. L. Hunting, now serving with the R.A.F., and Capt. C. P. Hunting. The Hunting brothers both served in the R.F.C. in the last war and entered the aircraft industry some years ago and have an interest in a group of companies.

Mr. W. A. Summers, who was Percival's works manager from 1935 to 1938, is to return to the firm as another of the directors, and it is announced that they will continue to specialise in light aircraft at least for the present.

R.A.F.V.R. Aircrew Club

A MISUNDERSTANDING appears to have arisen in regard to the above club, first mention of which was a letter from Mr. C. Smith inviting those interested to communicate with him at the Technical Staff Mess, R.A.E., Farnborough, Hants. This letter, which appeared in *Flight* of July 13th, was followed by a paragraph in our issue of August 3rd, inserted at Mr. Smith's request, to the effect that considerable interest had been aroused and reminding those interested in the club to communicate with the hon. sec. As before, the Farnborough address was given.

This has caused some people to confuse Mr. Smith, honorary secretary of the new club, with Mr. A. L. Harris, the honorary secretary of the Technical Staff Mess.

We are now advised by Mr. Harris that Mr. Smith has left the district, but that he (Mr. Harris) will try to have letters forwarded to him via the R.A.E.

D

INDOOR SPORT: Floyd W. Carlson, pilot of a Bell helicopter, being congratulated on his recent "indoor flight," believed to be the first to be made in America, and demonstrating the machine's complete controllability. Standing on his left are Capt. Howard Roth, of C.A.P., and Mr. Ray P. Whitman, vice-president of Bell Aircraft, while on his right is Mr. Arthur M. Young, head of the firm's rotor wing development department. Note the centrifugal governors.

Defeating V.1.

DEFEATING ITS OWN OBJECT. A flying-bomb which landed in the Pas de Calais immediately after being launched. Quite a number met their end in this manner.

Some Side-lights on the "Battle of London": Evolving the Best Fighter Technique: Smart Work by the R.O.C., A.A. and Balloon Commands' Transportation Triumph

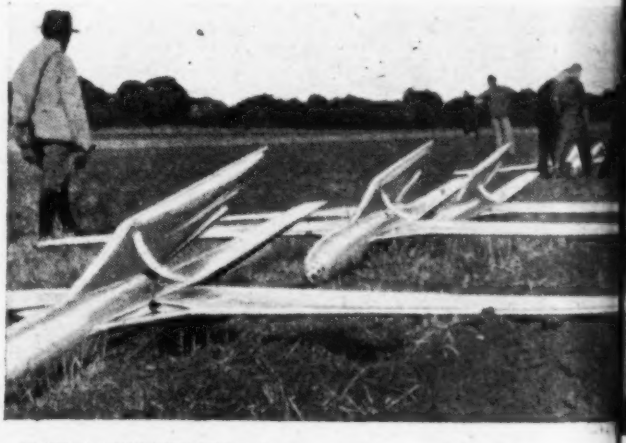
ALTHOUGH Mr. Duncan Sandys gave a very good account of the "Battle of London" against the German's much publicised secret weapon, the "V.1." when he held his Press conference on the subject at the Ministry of Information recently, it was inevitable that his account should cover only the main facts of the story. Much of that, too, was devoted to the disclosure—and extremely interesting it was—of how the existence of the V.1. was first discovered, of the amazing feat of reconnaissance which exposed the research station at Peenemünde in the Baltic, and the original 100 launching sites along the Pas de Calais.

Now They Can be Told

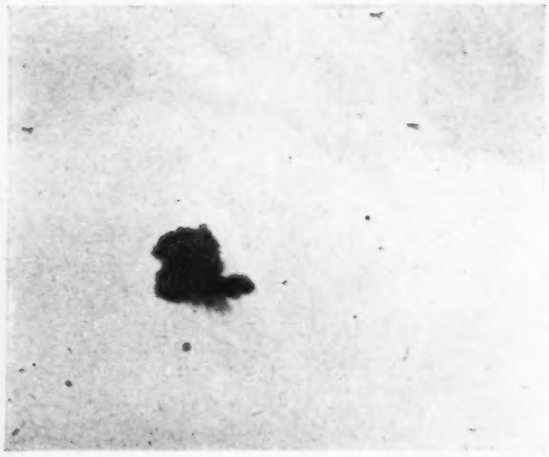
But from the moment when the first flying-bomb (to give it its officially adopted title, though we still think "air torpedo" is far more accurate) was launched against London early in June, many things began to happen—many a "good story" was enacted which could not be spoken of at the time, and which Mr. Sandys was obliged to skip over at the conference; there just was not time to go into all the details and to give everybody full recognition for the grand parts they had played in defeating this robot raider.

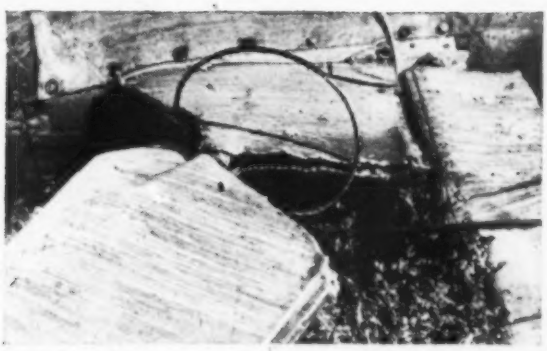
To a great extent the official figures speak for themselves; that the fighter pilots, the A.A. gunners, and those who handled the great balloon barrage together destroyed some 5,700 of the 8,000 missiles sent against this country is an eloquent indication of the degree of combined effort that must have been put forth in this unique fight. But behind those figures are a number of stories showing just what that effort meant in terms of human experience—the resourcefulness, the tireless vigil, and the personal courage displayed by all branches of the defenders of London.

The first line of defence was, of course, the fighter aircraft of A.G.D.B. There are probably those who imagine that tackling a robot which cannot shoot back or take evasive action is, to use a popular Service term, a "piece of cake." Nothing could be farther from the truth. So little was known about its habits and construction in the early days of the battle that fighter pilots had to experi-



EARLY EXPERIMENT. German rocket-propelled flying bombs of 1942. They were thought to be radio controlled.





INTO ITS OWN. The balloon barrage, as re-sited, did a big job in helping to defeat the flying bomb. (Left) : A bomb explodes as it is caught in the balloon barrage. (Above) : The tailplane of a bomb mutilated by a balloon cable.

ment and compare notes to work out the best method of attack; they had to find out how near they could get to the flying bomb without being blown up by it if their fire exploded it, and brave men died before the answer was obtained.

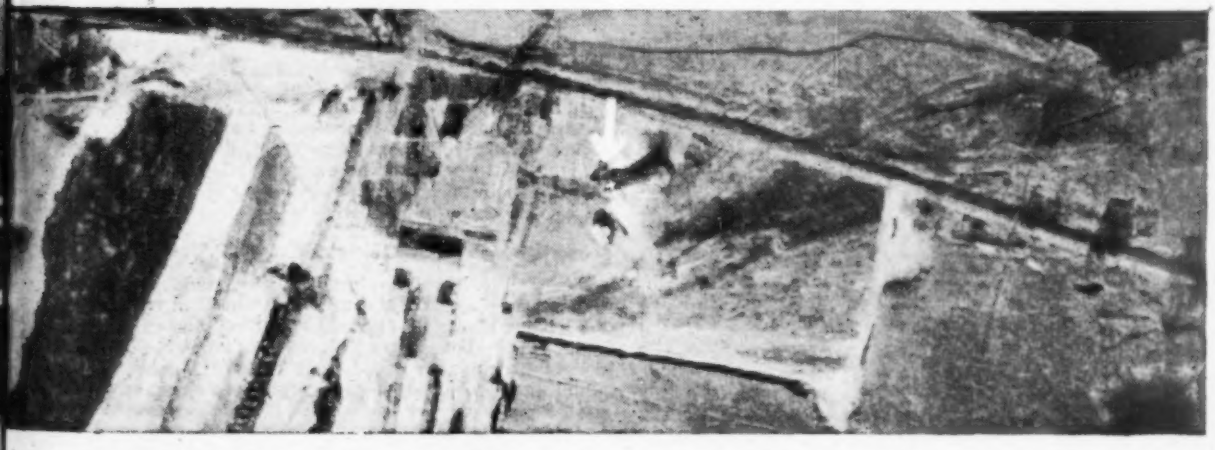
It was on the lawn of a cottage in Southern England that one of the most important little councils of war took place every evening during the first stages of the battle. The cottage was a wing intelligence office, and on its little lawn the pilots of a Tempest squadron led by Wing Cdr. Roland Beamont, D.S.O. and Bar, D.F.C. and Bar, gathered every evening to compare and discuss their experiences. Methods of approach and attack were discussed one evening, tried out the next day, and reported on that evening. During this experimental period nobody worked harder than the "Wing Co.," who flew day after day from first light till dusk, and finally the perfect method of attack was evolved—the approach from astern at an acute angle. Results were instantaneous; the "bag" went up hand over fist and casualties dropped equally sharply. And these were long summer days; the pilots spent 20 of the 24 hours within sight of their machines and slept when they could, but they were now only using 150 rounds for each "doodle" destroyed compared with more than 500 at first.

TOP SCORER Sqn. Ldr. J. Berry, D.F.C. and Bar, who destroyed 60 flying bombs in the air. He flew a Tempest aircraft and shot down as many as seven in one night.

A Delicate Operation

One could write reams about the fighters, but one more interesting sidelight must be added before passing on. In a busy period a pilot could run out of ammunition, and one day it was discovered by a pilot of one of the Polish squadrons on the job that by flying beside the bomb, getting his wing-tip under that of the robot, and giving it an upward flick, he could turn it on its back to go crashing down. Sometimes, however, this delicate trick turned the bomb round and headed it back towards the Pas de Calais which seems even better than sending it into the sea! Needless to say, news of this dodge soon spread among the pilots and it was often successfully used after that.

Very little has been said, so far, of the part played in this historic battle by the Royal Observer Corps, yet this tireless organisation is verily the backbone of our defences, and two of its members instantly identified the first flying bomb to pass over our coast, plotted its course, and reported its arrival within 35 sec. Smart work indeed,



HATCHING THE PLOT. A reconnaissance photograph of the experimental station at Peenemünde on the Baltic coast, showing a flying bomb on its launching ramp. The first bombs were launched against Sweden to ascertain results.

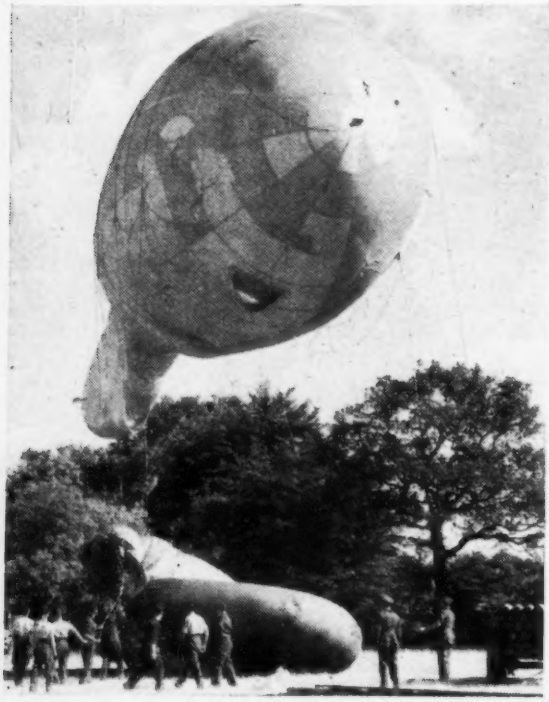
DEFEATING V.1.

DIRECT ACTION : Despite the efficiency of our gun, balloon and flying defences, real respite from V.I. did not come until the launching sites on the Continent were occupied. The Germans wrecked the ramps and derricks before leaving.

but no more than one has long since taken for granted from this highly efficient, "round-the-clock" organisation. And throughout the 80 days of the bombardment, the R.O.C., always on its toes, kept tag of every single V.1. that arrived by day or night. Nor is there yet any let-up, for while certain relaxations in Civil Defence arrangements have now been announced, these do not include any change in the non-stop vigilance of the Royal Observer Corps.

It is not always realised, in fact, that on the promptness and accuracy of the R.O.C. depends the operation of the air-raid warning system.

Anti-Aircraft Command's part against the V.1. is already well known; it was particularly self-evident to those who lived in that part of Southern England where the gun belt was situated. But there are certain interesting facts that it was considered unwise to disclose while the battle was on, which may now be told. It is already known that when the attack began the guns were deployed for the protection of our invading forces' departure ports, just in case the Hun had the temerity to try to interfere. It had been rightly estimated that the attention given by Bomber Command of the R.A.F. and by the British and American Air Forces of A.E.A.F. would delay the arrival of the flying bombs until after D-Day, and so priority was given to the invasion. When the word was given, on D-Day + 6, to put the Diver Plan into immediate operation, it meant moving all those guns to prepared sites in the prescribed gun belt. With all its ancillary equipment—Radar, predictors, field telephones and many other things—an A.A. battery is quite a complicated outfit, yet to give but one illustration of how swiftly the move was made it may be mentioned that one battery on the South Coast "folded its tents" at 9 p.m. in the evening and was ready to go into action by 8 a.m. next morning on its new site after having driven 90 miles to get there.



HOIST BY OWN PETARD : Two balloons of the closely-sited barrage with their cables in somewhat of a tangle.

Full Marks for the G.P.O.

Then, with all the guns installed, it was suddenly decided to augment the defences with a "last line" in the form of the balloon barrage This meant shifting some of the guns again, since you can hardly mix the two! The job was done with amazing speed, and the G.P.O. earned the admiration and gratitude of the gunners by ripping up all the 'phone wires they had worked like galley slaves to lay, and installing them on the new sites without a word of complaint. Later, of course, this gun belt, some 20 miles in depth, was shifted to the coast and a second fighter belt

DEFEATING V.1.

introduced between the A.A. defences and the balloon barrage.

Quite early in the fight it was discovered by the A.A. people that the "doodle bug" was a difficult target. It was small, it flew very fast and generally very low, and it could take punishment that would have brought down an ordinary aircraft. Near misses were no good, and thus it may be reckoned that practically every one of the hundreds brought down by the gunners represents a direct hit—and this on a small, fast, low-flying target that gives the gunner the worst possible chance. Such accuracy was not possible with the predictors at first being used, but was obtained by re-equipping the batteries with the latest type of American "radar" having a much greater pick-up range, and a new type of predictor which solved the triangle in far less time than its predecessor. Moreover, the installation of static guns on the coast, where a far better field of fire was presented, also increased the efficiency of their fire.

Another little problem was that of avoiding any confusion between our guns and fighters. A definite line was drawn beyond which the fighter-pilot knew he would be liable to run into A.A. fire, and at night this limit was marked by searchlights. Even so, the keen fighter-pilot who found himself nearing this line, when hard on the tail of his quarry, frequently took the risk of crossing it, and so it often depended on the watchfulness of the fire-control officer to avoid accidents. It was just another instance of that close co-operation between the Services which is playing a bigger part in the success of the Allied Forces than many realise even yet.

Back in the Front Line

The final defence line, the balloon barrage, accounted for 278 of the flying bombs which escaped fighters and guns and were heading for London. When the first curtain of 500 balloons was decided upon, Balloon Command, under Air Vice-Marshal W. C. C. Gell, found that it was required outside the normal London barrage where no previous facilities for this type of defence existed. A reconnaissance party at once set forth to stake out the sites, and some of these were in such remote spots that it was even necessary to build roads capable of carrying the heavy lorries transporting hydrogen cylinders and other equipment and supplies.

It was on June 16th that Balloon Command H.Q. received a signal ordering the deployment of the barrage, and no sooner were these 500 balloons in position and flying than another 500 were ordered. This meant finding and preparing more sites, and one squadron travelled 300 miles with all its equipment to answer the call from the south. But before the second 500 were even in position, a third order was received increasing the total to 1,750. Squadrons were rushed south from all over Great Britain; five thousand miles of telephone cable were laid by G.P.O. engineers, R.A.F. Signals and the Royal Corps of Signals to connect all the sites to headquarters; W.A.A.F. telephonists manned the instruments. To transport personnel and supplies, including hydrogen cylinders from factories to all parts of the country, a fleet of some 3,000 vehicles was assembled. Their drivers worked a 24-hour system and many of them did not remove their clothes for days on end. Like the fighter-pilots and the A.A. gunners, the balloon crews kept unbroken vigil, snatching brief periods of sleep whenever there was a lull. Many of them were in the front line again for the first time since the first blitz and had the perilous satisfaction of seeing many a bomb brought down by the cables of their balloons or deflected from their course. Sometimes the robot would be exploded in the air, but frequently it crashed on or near the balloon site or an adjacent searchlight battery, and, needless to say, there were casualties.

But even as grim an affair as the fight against V.1. can have its humorous moments—and one story—we shall not say if it concerned the guns or the balloons—is worth repeating. There was, of course, a healthy rivalry among the individual crews manning the ground defences in claiming credit for every "doodle bug" destroyed. One day, however, a V.1. whose flight towards London was successfully interrupted was ill-mannered enough to plunge into the camp and "write off" the tent and personal belongings of no less a person than the Commanding Officer. And believe it or not, none of the crews seemed at all anxious to claim it!

DAZZLING PERFORMANCE. The gun crews had a trying time because many of the flying-bombs were launched during the early part of the day while the sun was low in the east and south-east.

Elaborate Camouflaging

After the Pas de Calais area had been captured by our Forces and the "vipers' nests" put out of business, several interesting facts came to light upon examination of their remains and, most probably, as a result of questioning prisoners taken. An excessively humid atmosphere, it seems, made this none too reliable weapon even more temperamental, which explains why there was often a lull when it seemed over here that they were wasting a chance to take advantage of ample cover from low-hanging clouds. The need to hide as much as possible from the R.A.F. (not to mention local patriots) drove the Germans to bury such "spares" as the spherical compressed-air bottles in holes in the ground covered by brushwood. The jet units were tested, prior to final assembly and launching, in small concrete sheds with "drain-pipe" exhausts emerging at ground level. The bomb was launched by a rocket inserted in the back of the jet tube. The final charge in the rocket ignited the fuel and started the jet unit, which had no electrical ignition but was self igniting once started.

It has only been possible here to augment the broad story of the Battle of London with just a few side-lights. Much still remains untold, including numerous instances of individual courage and devotion to duty by personnel of the several Services which took part. To conclude, it may be added that the Air Council has recently sent messages of congratulation to the various Commands and Services, including the United States Strategic Air Force, on the parts they have played in the defeat of the flying bomb.

PORTRAIT GALLERY..

SOME OUTSTANDING PILOTS OF THE WAR

(1) Wing Cdr. E. P. Wells, D.S.O., D.F.C.
(2) Air Comdre. Whitney W. Straight, M.C., D.F.C.
(3) Wing Cdr. P. B. Lucas, D.S.O., D.F.C.
(4) Wing Cdr. F. D. S. Scott-Malden, D.S.O., D.F.C.
(5) Wing Cdr. T. G. Mahaddie, D.S.O., D.F.C., A.F.C.
(6) Wing Cdr. B. R. Walker, D.S.O., D.F.C.
(7) Flt. Lt. C. F. Rawnsley, D.S.O., D.F.C., D.F.M.
(8) Wing Cdr. D. E. Kingaby, D.S.O., D.F.M.
(9) Sqn. Ldr. R. A. B. Learoyd, V.C.
(10) Wing Cdr. C. E. Currant, D.S.O., D.F.C.
(11) Group Capt. J. R. Gordon-Finlayson, D.S.O., D.F.C.
(12) Air Comdre. K. B. Boyd Cross, D.S.O., D.F.C.
(13) Wing Cdr. A. C. Deere, D.S.O., D.F.C.
(14) Wing Cdr. R. P. Beamont, D.S.O., D.F.C.
(15) Wing Cdr. J. R. D. Braham, D.S.O., D.F.C.
(16) Group Capt. P. G. Jameson, D.S.O., D.F.C.
(17) Air Vice-Marshal H. Broadhurst, D.S.O., D.F.C., A.F.C.
(18) Group Capt. J. Cunningham, D.S.O., D.F.C.
(19) Wing Cdr. G. B. Gibson, V.C., D.S O., D.F.C.
(20) Wing Cdr. R. H. Harries, D.S.O., D.F.C.
(21) Group Capt. P. G. Wykeham-Barnes, D.S.O., D.F.C.
(22) Group Capt. A. G. Malan, D.S.O., D.F.C.
(23) Wing Cdr. Crawford-Compton, D.S.O., D.F.C.
(24) Group Capt. J. E. Johnson, D.S.O., D.F.C., American D.F.C.
(25) Wing Cdr. C. F. Grey, D.S.O., D.F.C.
(26) Wing Cdr. G. L. Raphael, D.S.O., D.F.C.
(27) Air Vice-Marshal D. C. T. Bennett, C.B.E., D.S.O.

Behind the Lines

Service and Industrial News from the Inside of Axis and Enemy-occupied Countries

Escape

DISILLUSIONED and browned-off with the war, Peter Kellenberger, a 23-year-old *Luftwaffe* transport pilot who was temporarily stationed in Denmark, escaped from there on a training aircraft and landed in Varberg, Sweden.

Bomber Effect

MILAN workers—says a neutral report—must in future continue to work during the "less serious" night air raids, as, according to *Corriere della Sera*, the number of such raids has been lately so considerable that "all production has been paralysed."

Finita La Commedia

FROM Italy it is reported that Mussolini's Fascist Air Force will shortly be disbanded. All officers and other ranks who do not accept incorporation in the *Luftwaffe* will be deported to Germany.

On August 25th, in anticipation of this measure, a German detachment arrested all members of the Air Force at the Italo Balbo Barracks at Milan.

Old Bones

AN article in the *Münchner Neueste Nachrichten* praises the work of the motorised A.R.P. units of the *Luftwaffe* whose members wear uniforms with a black lapel badge and whose cars are marked with a white squirrel. "From a small beginning," the article says, "they have to-day developed into the A.R.P. regiments of the *Luftwaffe*, equipped with all modern technical apparatus.

"Certainly they are not exactly smart young fellows who shine in military reviews; they should rather be called *alte knochen* (old bones). Their average age is at least 42."

The article then says that the unit mobilised in Munich consists almost exclusively of men from the industrial districts of the Rhineland and Westphalia and from Hamburg, most of whom have been totally bombed out.

Luftwaffe Reports

"FROM May onwards," says a report of the German News Agency, "there was a considerable improvement of Germany's defensive strength, due above all to the continued improvement of day and night fighters.

"New types of German 'lightning fighters' (*Blitzjaeger*) have been used recently whose fighting power was exceptionally high."

During the first eight months of this year the *Luftwaffe* claims to have destroyed 11,967 British and American and 13,000 Russian aircraft.

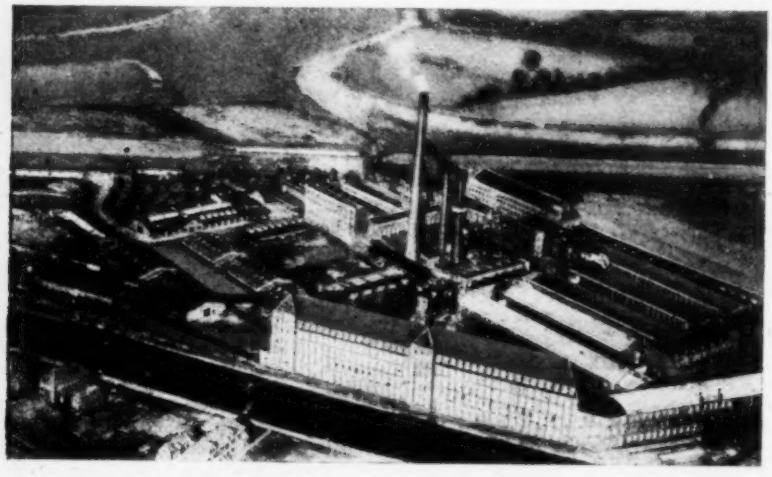
Hope

"THE *Luftwaffe* believes its day will yet come in spite of the present overwhelming Anglo - American air superiority," said Karl Zeppelin, air correspondent of the German Overseas News Agency.

"While nothing can be said regarding the weapons with which the *Luftwaffe* hopes to break the enemy air superiority, says Zeppelin, it may be mentioned that they are based on radical 'technical' developments which promise to revolutionise flying technique.

"The *Luftwaffe* will soon be able to show the first practical results in the shape of aircraft of a new kind. They will give her an advantage the enemy will not soon be able to equal.

"Germany requires a fighter to outfly and outclimb the best enemy fighters and a bomber faster than enemy fighters. Even a small number of such aircraft will enable the *Luftwaffe* to wrest air superiority from the enemy. It is believed that such weapons will become available within a measurable time."



ONE OF THE TARGETS: An air view of the Excelsior A.G. rubber factory at Hanover-Limmer, one of the oldest plants in Germany. Hanover was recently subjected to heavy bombing.

Winding Up

NORWEGIAN and Russian refugees who have arrived in Sweden from North Norway say that the German fighter air force has almost disappeared from the central airfields in North Norway. The main base near Altafjord, where the air force operating against the Murmansk route previously numbered about 600 aircraft, has now been reduced to five or six aircraft.

Luftwaffe Losses

COMMODORE COUNT VON SCHOENBORN, described as a veteran German dive-bomber pilot, has been killed in action, states the German News Agency.

He was awarded the Knight's Cross of the Iron Cross for his "distinguished service" over Maastricht, Antwerp, Louvain, Namur, Boulogne, and Dunkirk in the Western campaign of 1940.

German fighter ace Lt. Friedrich Wachowiak, credited with 86 air victories and bearer of the Knight's Cross of the Iron Cross, is missing after an operational flight.

Post-mortem

WITH the liberation of Paris and the collapse of the Vichy Government it may be of interest to review briefly the organisation of the aeronautical services of the collaboration Government:

A.A. Defences (*Defense Contre Avions, D.C.A.*), with offices at 35, Rue Saint Didier, Paris, were headed by Girardot, the former Chief of the Paris-Le Bourget airport.

At the same address was also situated the Administration of Civil and Military Officials of Aeronautics (*Service du Personnel Fonctionnaire Civil et Militaire*), headed by Vivent, the former Deputy Director of Civil Aviation; Vivent's Deputies were Hocquet and Gaté.

The duties of the so-called Airport Service (*Service des Port Aériens*), which had its headquarters at 17, Avenue Théophile Gautier, Paris apparently covered a wider field than is indicated in its designation. The Chief of the Service was Renvoise, who in turn controlled a Division for the Operation of Aerodromes and Airways (*Exploitation des Aérodromes et Routes Aériennes*), one for Flying Personnel (*Personnel Navigant*), both under Florentin, and one for Air Training (*Instructions Aéronautiques*) under Col. Devé.

The Aeronautical Communications and Signalling Service (*Service des Télécommunications et de la Signalisation*), offices at 25, Boulevard Gergovia, Clermont-Ferrand, was headed by Pasckewicz and his Deputy, Laloy; it operated a branch at 17, Avenue Théophile Gautier, Paris, with M. Vannel in charge.

Finally, the headquarters of the National Meteorological Office (*Office National Météorologique*), which also in France was attached to the administration of aeronautics, has remained at 196, Rue de l'Université, Paris; it continued to be headed by Wehrlé. More than other departments was this service indirectly managed and supervised by the Germans.

"Golden Hind" Goes East

Reconverting One of the Empire-class "G" Boats for Civil Flying

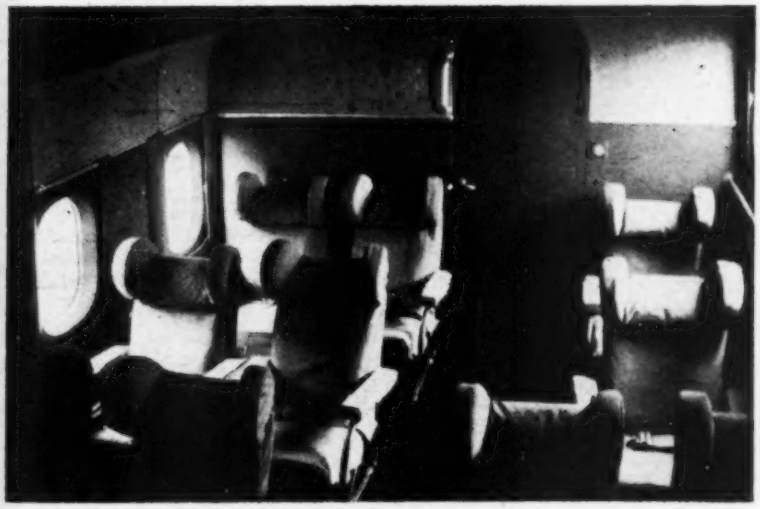
MUCH has been talked and written of the possibilities or otherwise of converting military aircraft types for civil use after the war. In a general way, it may be said that to do so is possible but not very profitable. The conversion, by the British Overseas Airways Corporation, of a Short Empire flying boat of the "G" class is in a different category. The boat was originally designed and built as a civil machine, and in the earlier stages of the war it was converted into a military type. Thus it became rather a question of converting it back, not to its original form, but to one which did not entail too great modifications, nor too much addition of weight. The boat in question is the *Golden Hind*, and she left England recently on a delivery flight to East Africa.

When it was decided to furnish this flying boat she still bore traces of her R.A.F. service life in the form of turret fairings, depth-charge doors and the like, but she carried seats for 40 passengers, some in rather cramped positions. The aim was to provide a reasonable degree of comfort for a minimum expenditure of payload and as little reduction in seating capacity as possible. In actual fact, the seating capacity was reduced to 38, a high degree of comfort was obtained, and the noise level in the cabins was reduced quite considerably, all for the expenditure of about 550 lb.

Two innovations were incorporated in the *Golden Hind*. One is a concealed escape hatch working on a press-button system; and the other the fitting of panels to house the "defence" and black-out curtains.

On account of hull primary structure, the passenger accommodation was split up into four compartments, larger than those on the peacetime Empire flying boats, but in general layout rather similar. The ceiling and upper half of the walls are of a light grey fabric, the lower half of the walls dark grey and the chairs and carpets green.

In order to obtain a low weight figure, a lighter material than leather had to be found for the lower half of the walls, and I.C.I. were able to produce two alternatives—pre-doped fabric and Vynide. In order to test these materials under service conditions both were used, Vynide in one cabin and pre-doped fabric in the other three.



One of the cabins in the reconverted *Golden Hind*. Extensive use of fabric instead of panels saved a lot of weight, and the fabric was found fairly effective for sound-proofing.

By using pre-doped fabric (that is, the first coats of dope applied mechanically before fitting the fabric to the aircraft) it was possible to obtain a good smooth finish without any "rubbing-down"; a non-inflammable dope was used, and the final coat was dark grey to accord with the general colour scheme.

Vynide is obtainable in a variety of colours, but in this case a grey leather finish was used. This material, backed by normal aircraft fabric, is very little heavier than the doped fabric, has a hard but flexible washable surface, and is non-inflammable.

Although no special sound-proofing material was used, the noise level in the cabins was reduced very considerably, even where large panels of doped fabric were used. By careful use of mouldings and design of hat racks, escape hatches, window blinds, etc., the interruptions on the wall-surfaces were reduced to a minimum; this increased the apparent size of the cabins and gave a restful appearance.

(*Continued on p.* 317.)

A.T.A. Achievement

A Word of Praise for the "Back Air Boys" on the Occasion of the Fifth Anniversary of the Unit

SOON after the outbreak of war, at any rate during that fateful month of September, 1939, a small pool of pilots was formed by Mr. Gerard d'Erlanger of the British Overseas Airways Corporation. That was the modest beginning of the unit now known as the Air Transport Auxiliary. It comprised some 30 experienced civil pilots who were attached to two R.A.F. stations and shared with the Service the task of ferrying fighters and bombers from the manufacturers' works to the maintenance units which were responsible for installing some of the military equipment. Within a few months there were four ferry pools, the pilots were given their own uniform (based on that of B.O.A.C.), and were no longer under the direct control of the R.A.F. The work expanded, and within a year or so of the formation of the unit, the Air Ministry entrusted to it the entire responsibility for ferrying service aircraft within the British Isles. By then the strength of the unit had grown to 133 pilots, 20 of whom were women.

Captain Harold Balfour, Under-Secretary of State for Air, paid a tribute to the work of the A.T.A. at an anniversary dinner held on September 11th. He said:—

Quarter of a Million Aircraft

The Air Transport Auxiliary has fed our fighting forces to the extent of about a quarter of a million aircraft of over 135 different types, safely delivered to their bases in England and on the Continent.

It is an achievement of tremendous and first-class importance to the war effort. The exploits of famous fighter and bomber pilots would not have been possible if it had not been for those whose work we honour to-night—the Air Transport Auxiliary. There is a saying that the scientific achievements of the "back room" boys of the M.A.P. made possible our victories over the *Luftwaffe*. But it is equally true that if it had not been for the "back air" boys and girls of the A.T.A. these victories could not have been won.

The R.A.F. said "give us the tools," and the response of the A.T.A. has never failed. R.A.F. pilots on many occasions declare publicly that they owe everything to the devoted skill of the ground crews who keep their aircraft flying, but they are also the first to pay tribute to their comrades of the air in the A.T.A., who have made it possible for them to carry the war to the enemy.

There is no type of aircraft that the A.T.A. cannot fly, from the humble Moth to the latest types of secret aircraft, and for the servicing of their fleet, more varied in types than any other in the world, more than 1,000 experienced engineers are employed.

To the personnel of the A.T.A., under the leadership and command of Commodore Gerard d'Erlanger and his able lieutenant, Senior Commander Philip Wills, down to the last joined mechanic, there is a national debt of gratitude which must be lasting, and, I trust, will never be forgotten.

The A.T.A., when it came into existence soon after the war, possessed a nucleus of 39 pilots. To-day it has over 700 pilots located at more than 15 centres spread throughout the United Kingdom. As an instance of the varied and arduous nature of the work entailed, one pilot's log recently showed that, after flying to an aircraft factory from his centre in an Anson taxi, he delivered in one day a Stirling, a Sunderland, a Mosquito and a Liberator.

Like the Royal Air Force, the A.T.A. is an Imperial—even an International—force, for Canada, New Zealand, Australia and Rhodesia all provide their quota of pilots, and in addition the U.S.A., Poland, Belgium, Denmark, and even Siam, are represented amongst its personnel.

We know the work is hard and hazardous, for A.T.A. pilots have to fly in all kinds of weather, with one object only—to deliver the goods safely. It is evidence of the hard, responsible and often dangerous nature of their work that of the 39 original pilots no fewer than 19 have given their lives in ferrying His Majesty's aircraft. Their sacrifice has been just as much one given to the Nation as that of an air crew stricken down over enemy territory.

Famous Names in A.T.A.

There are many names famous in aviation included in those who have lost their lives, and equally, I am glad to say, that there are many names still famous who are to-day continuing their work in the A.T.A., and who we hope will be heard of much in post-war aviation circles.

A special word of praise is due to the women pilots who number just over 100, and also to the women ground staff. If ever there was any idea of sex inequality in aviation, this has been effectively disposed of by the achievements of the women's section. With the natural wish of the male "closed shop," before the war men used to make it a practice to say that women could never really fly. A few of the braver ones performed outstanding achievements, and others enjoyed Saturday afternoon flying in the Club Moth, but, by and large, men said that this was a man's job. Now our Trades Union has been broken wide open, and I think that in post-war aviation the sex union of males will have to alter its rules or it

will never hold its position. The women have come to stay, and I can see no reason why they should not fill almost any position in post-war civil aviation.

This work of the A.T.A. must not be allowed to die after the war. In some direction or another, individually if not collectively, the spirit and achievements of the A.T.A. must be allowed to count towards the future of flying in this country.

British Aviation After the War

I do not accept at all what many critics, some with knowledge and many without, are loudly saying as to the inevitability of Britain's inferior position in the post-war civil aviation of the world. I think it does British industry little good to keep on crying "stinking fish," long and loud, about present and future types of British transport compared to those of other countries, for I have confidence that British industry can still turn out the world's best product, given opportunity to do so.

Of course we are at a disadvantage at the present, and will have to make up the lee-way lost to us, because of the working of the agreed policy of the Allies, that we should concentrate our resources on combat types, leaving to others the supply of transports for our joint use. If this has cost us a position of disadvantage for British civil aviation in the immediate post-war period, let us look at the huge gain on the other side of the balance sheet.

We have achieved absolute superiority over the *Luftwaffe* in every theatre of war, and without which D-Day landings would have been impossible. We have battered German industry and communications which has made possible the spectacular advances of our armoured ground forces. We have beaten the U-boat menace.

The air is to the Allies. Could we have done it with less? Could we have switched over industrial capacity sooner to transport types with an eye to post-war? Our critics of red leather benches and armchairs say "Yes." They are entitled to express their views, but it is not they but we who have had the responsibility of ensuring adequate aircraft supplies for these and other fighting tasks.

It is we, not they, who had knowledge of what was available. It is we, not they, who had to assess the requirements for the fulfilment of battle tasks in relation to what we had at our disposal. We have won our objectives, but if we had not done so, would not those very same critics have been in the van of condemnation—and rightly so?

Would not those same critics have castigated the Air Ministry as having betrayed the Nation's trust and failed our gallant aircrews? It is when victory in the air has been achieved that it is easy to forget the sacrifices, not only of life and material but also of opportunity, which must be accepted as part of the price to be paid. And that, Mr. Critic, is all I have to say to you.

The very speed at which the war is travelling towards defeat of Germany has given us an opportunity to speed up our programme of civil types. So let us stop arguing about what has happened in the past and get on with the job.

For the first time since 1939 we can lift our eyes from the paramount purpose of beating the *Luftwaffe*. Let Britain go forward now in a united effort to make up the lee-way—which we ought joyfully to accept for what it has brought to us.

Criticism Welcomed

Governments are rightly meant to be criticised, and it is a healthy and right process in a democratic system. So by all means criticise the Air Ministry, the Ministry of Aircraft Production, the Ministers of those Departments and everyone else therein, for it would never do for anyone to show signs of becoming complacent or satisfied, but rather should one always be conscious of shortcomings.

However, from now on I hope the public will turn this spotlight of critical attention on our Departments in respect of their future policy and actions and this is as it should be. Plans and programmes do exist for an orderly world system of civil aviation, rather than uncontrolled international competitive chaos. Plans do exist for spreading British civil aircraft over our Empire routes. On these let the Government be judged during the coming months.

Governments can come and Governments can go. Men can change positions, but I am sure that as a Nation in the field of civil aviation we need not and shall not be found wanting in the long run.

WEST AFRICAN AIR CORPS

MANY hundreds of R.A.F. men now in West Africa will be released for service elsewhere when recruiting for the newly formed West African Air Corps is complete. Some have already been released by the employment of African civilians.

The first recruit was enrolled on the last day of January this year. Already nearly 3,000 have joined, and by the middle of next year the total is expected to be over the 6,000 mark. They will form part of the R.A.F. West African Command which, in conjunction with the Royal Navy, keeps open the central Atlantic shipping routes.

The scheme began as far back as 1942, when the Inspector-General of the R.A.F., after a visit to West Africa, strongly recommended the enlistment of Africans rather than their continued employment on a civilian basis.

In April, 1943, Group Captains D. W. Stannard and G. A. R. Muschamp undertook a tour of Africa from Gibraltar to Zanzibar and back to Cairo to invesigate the potential field of employment. Group Captain Stannard was unfortunately killed in an air accident on the way back, but Group Captain Muschamp returned with the plan which six months later began to take shape.

Now Africans are enrolling for training as fitters, draughtsmen, carpenters, electricians and many other trades. Pay ranges from 1s. to 5s. 6d. a day according to trade and rank, besides a marriage allowance of 6d. a day and free food and accommodation. It is hoped that many of their trades will be useful to them after the war. One recruit has already gained the rank of flight sergeant.

Although many different tribes are represented among those who are joining the Corps, most of the recruits speak English, and this will be the common language. They are serving at Air Force bases in Gambia, Sierra Leone, Gold Coast and Nigeria. Among them are men who have fought with the Army in North Africa.

"GOLDEN HIND" GOES EAST

(Continued from page 315)

If fewer than 32 passengers are carried, one side of the main cabin is arranged as a promenade so that passengers may lean against a rail and look out of the windows. Smoking is permitted in three of the cabins. Fresh air, pre-heated to any required temperature, is supplied to each cabin, and a pantry and steward's accommodation is provided in the forward end of the boat. Two lavatories and washrooms are situated just aft of the rear passenger cabin and a third for crew's use is located forward, beside the access to the control deck.

Freight holds are situated above, before and behind the passenger cabins, and are capable of taking a total of 9,000 lb. Lifting tackle is also provided capable of lifting a complete Hercules engine from a launch alongside.

With very comfortable accommodation for 38 passengers, stowage for 4 tons of freight and 3,600 gallons of fuel and a maximum loaded weight of 33¼ tons, *Golden Hind* is capable of carrying a great variety of loads.

NIGHT SLEEPERS TO NEW YORK

AS soon as the war is over in Europe, Scottish Aviation Ltd., it is reported, will operate a night-sleeper trans-ocean service between Prestwick (Ayrshire) and New York at fares below ships' average first-class rates. Group Captain D. F. McIntyre, the company's managing director, recently said that American companies have similar plans for the moment "cease fire" has been sounded over Europe. "There will be no lack of bookings," he said, "because already there is a great demand for air traffic. We have had hundreds of enquiries for particulars."

At the beginning, airliners will carry 20 passengers and the trip will take 16 hours to New York. Subsequently the number of passengers will be increased and the time will be cut to 11 hours. Fares will also drop. Other routes will be worked, too.

Blackpool Airport

Ambitious £30,000,000 Scheme for Transocean Terminal : Airport Within an Airport : To Cater for 50,000 Passengers Daily When Fully Developed

VARIOUS references have already been made in *Flight* to the several airport proposals recently put forward by a number of seaside and other towns in the north-west of England, but Blackpool would appear to be the first to come out with actual plans and get them approved by the Air Ministry and passed by their own local Council. And what ambitious plans they are!

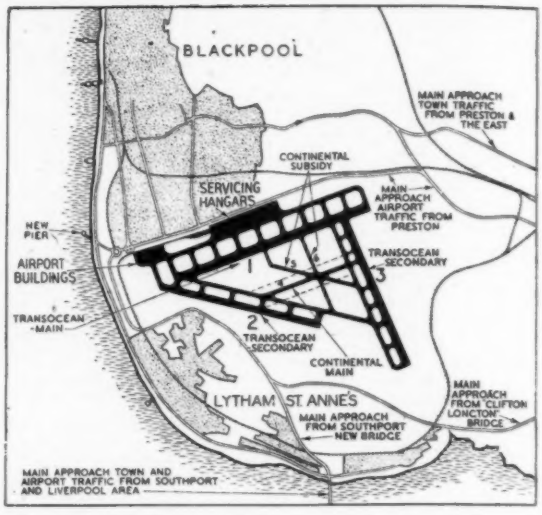
The complete scheme, which comprises a transocean air terminal for landplanes and an adjacent lagoon for flying boats, has been planned in relation to the town's general development scheme, and it is estimated that the total cost of the project would be around £30,000,000.

Triangular Layout

Claimed to be, when completed, the most comprehensive and well-equipped air terminal in the world, its No. 1 runway for transocean aircraft is 5,000 yd. long and 200 yd. wide, and is, of course, laid in the general direction of the prevailing south-westerly wind. Runways Nos. 2 and 3 are 4,000 yd. long and 150 yd. wide, and a triangular layout is adopted as shown in the accompanying sketch plans prepared by the Council's consultants, Guy Morgan and Partners, and Mr. Brian H. Colquhoun. Each of these three main runways is flanked by a taxiway to which it is linked at frequent intervals. This enables aircraft landing-on to turn off the runway on to the taxiway at the earliest possible moment, and thus clear the deck for the next one with minimum delay.

Within the gigantic triangle of land enclosed by the three transocean runways and their taxiways are three more runways for Continental and feeder-line services. The chief one, Runway No. 4, runs parallel to No. 1 and is 2,750 yd. long. Runways Nos. 5 and 6, parallel to Nos. 2 and 3, are each of 2,200 yd. It is understood that provision has been made for the construction of the necessary facilities to deal with Continental and feeder-line traffic quite separately from the transocean traffic, so that there would be an airport within an airport. An important advantage attached to this arrangement is that passengers (and freight) arriving from, say, New York, could transfer to a Continental or feeder-line aircraft with minimum delay. In fact, this business of not wasting, on the ground, a considerable part of the time saved by flying, is reflected in the up-to-date equipment to be provided, as well as by the general design, and it is considered that the accommodation provided will be capable of handling "more than 50,000 passengers a day, inward and outward, from and to all parts of the globe at frequent and regular intervals throughout the day and night and in all weathers."

Blackpool Corporation may, perhaps, be thought to be extremely optimistic about the degree to which people will want (and be able to afford) to fly about the country, the Continent, and the world in days to come, but it should be stressed that the full development of this scheme to its full capacity is expected to take 15 years. Furthermore, it would not have been very far-sighted to have catered only for a relatively small expansion on immediate post-war expectations, thus the runways are to be capable of taking aircraft more than twice the size and weight of the biggest bombers and transports of to-day, and the accommodation capable of dealing with the greatly increased numbers of passengers and tonnage of freight such machines would be able to carry. In respect of freight, mails, etc., the airport's road and rail terminal connections have been planned to cope with the maximum amount without interfering in any way with the efficiency of the passengers' amenities. It is scarcely necessary to add that the most modern hotel accommodation is to be provided adjacent to the airport buildings and facing the sea. A new pier, as near as possible to the administrative buildings but clear of the take-off and approach paths of the seaward end of Nos. 1 and 2 runways, is also intended.



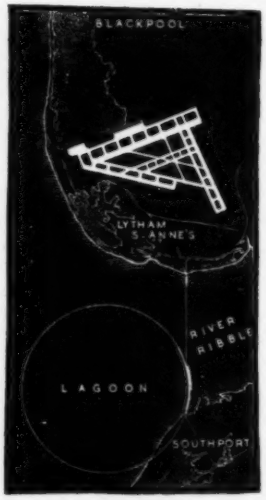
TRIANGULATED TERMINAL : Besides showing the layout of transocean and subsidiary runways and taxiways, this sketch gives a good idea of the great area (approximately 5,000 acres) covered by Blackpool's ambitious airport project.

Lagoon for Flying Boats

The proposed lagoon for flying boats is to be four miles in diameter and, as the smaller sketch shows, abuts on to the Southport shores of the Ribble estuary, and its administrative buildings are to be connected to the main aircraft terminal by a road and rail tunnel under the river. The chief idea is that passengers arriving, say, from West Africa by flying boat, can be transferred to the New York airliner in a matter of perhaps a quarter of an hour or 20 min. complete with baggage.

Meteorological conditions in this locality are excellent for flying and, as already stated, the whole project has received the blessing of the Air Ministry as conforming with all requirements for an air terminal of this kind.

Objections to the project have, as previously reported, been raised in certain quarters. The result remains to be seen.



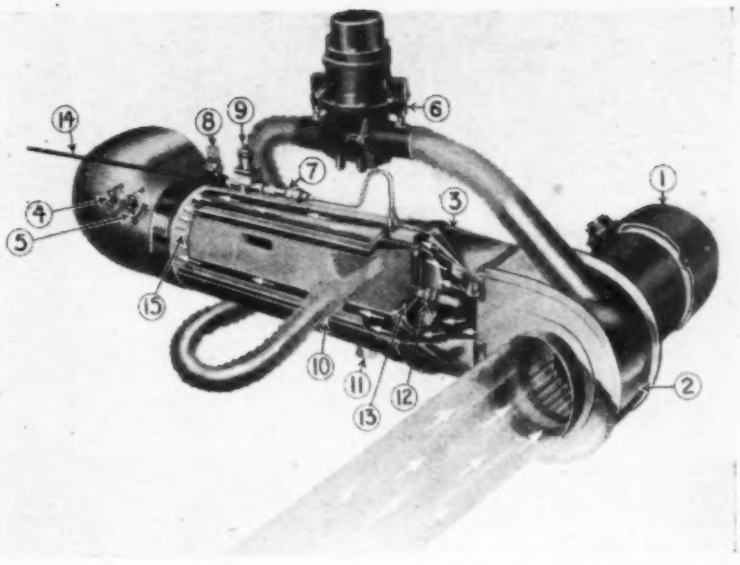
Position of airfield and lagoon relative to surrounding features.

Aircraft Heating

A New System Which Operates Independently of the Engine and at All Altitudes

"JANITROL" is the name given to a system of aircraft heating developed in the United States by the firm Surface Combustion, of Columbus, Ohio. Liquid fuel is employed, of the same quality as that used in the engines of aircraft, and the heater units operate automatically, although a hand control is also provided.

Hitherto is has been customary to heat aircraft cabins by means of a collector ring or manifold from which the exhaust gases pass into a heat exchanger. There are several drawbacks to this system. The exhaust gases reach high temperature and thus have considerable corrosive effect which may perforate the metal and thus allow carbon monoxide to enter the air which is being heated. Back pressure on the engine, resulting in a certain loss of power, is another objection to the old system, and the fact that the heat exchanger must be located close to the engine makes necessary a somewhat elaborate system of ducting.



Details and principal parts of a "Janitrol" heater: 1, motor; 2, blower; 3, adapter; 4, limit switch; 5, glow-plug cut-out switch; 6, combustion-air differential regulator; 7, metering nozzle; 8, filter; 9, fuel cut-off valve; 10, combustion-air inlet; 11, exhaust outlet; 12, glow-plug; 13, vaporiser; 14, fuel pipe; 15, ventilating air.

Four Essential Conditions

When Surface Combustion began to tackle the problem of an independent heat source, four conditions were laid down as essential to satisfactory operation. The first was the control of the combustion air so that a constant *weight* (i.e., volume increasing inversely as density) of air should be delivered to the heater at any speed, height and temperature. The second condition was closely linked with the first: a constant flow of fuel. The third was satisfactory ignition of the air-fuel mixture at high altitudes and down to 70 deg. below zero. The fourth was keeping the flame alight under all conditions.

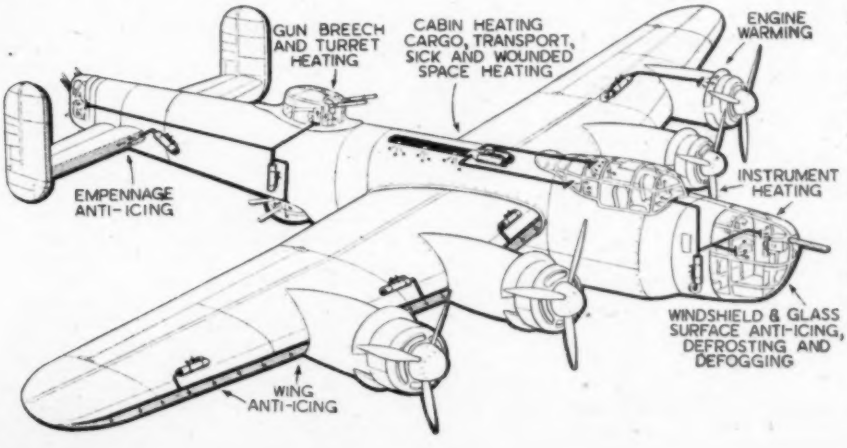
Some of the illustrations show how these four conditions were satisfied. Heater units have already been developed which range from a capacity of 15,000 B.T.U. to more than 100,000 B.T.U., and even larger units are being developed, although in many cases a multiplicity of smaller units may offer a better solution.

Reverting to the four basic conditions and the manner in which they have been met in the "Janitrol," that of a constant weight of air was achieved by taking in the air through a forward-facing scoop on the outside of the fuselage. The "ram" effect is, of course, such that at low altitudes there would be an excess of air, so that it became necessary to by-pass the air through a differential air control, operated on the sylphon bellows principle. The second condition, constant fuel flow, was solved fairly simply by utilising the aircraft fuel system, which already had sufficient pressure for the purpose.

A Stormproof Flame

Igniting the air-fuel mixture at great altitudes and down to 70 deg. below zero was found to be possible by electric spark, or resistance wire, and at low temperatures the fuel could be pre-heated by a glow-coil.

To provide a flame which would not "blow out" in any circumstances was, perhaps, the greatest problem of all. As altitude is gained and the air becomes less dense, a greater volume of air has to be supplied (in this case by the automatic differential air control) in order to keep the weight of air supplied the same. This means that the air is entering the combustion chamber at greater velocity, and the ordinary steady flame would be likely to be extinguished. The solution was


GUN BREECH AND TURRET HEATING
CABIN HEATING CARGO, TRANSPORT, SICK AND WOUNDED SPACE HEATING
ENGINE WARMING
INSTRUMENT HEATING
EMPENNAGE ANTI-ICING
WINDSHIELD & GLASS SURFACE ANTI-ICING, DEFROSTING AND DEFOGGING
WING ANTI-ICING

Drawing showing installation of "Janitrol" high-altitude heaters in a large aircraft

AIRCRAFT HEATING

found in the "whirling flame" developed specially for the "Janitrol" heaters. It is produced quite simply and without mechanical complications by introducing air into the cylindrical combustion tube tangentially to its inner surface.

The "Janitrol" heater works on aircraft fuel, normally high-octane petrol, but with modifications it will operate on other liquid fuels. The fuel enters the combustion tube through a vaporiser or spray nozzle ahead of the combustion air inlet. The atomised fuel mixes with the spinning air, thus producing a whirling flame. The flame pattern is comparable with a tightly-wound spiral and results in complete combustion within a pre-determined period of time and length of flame-travel. It has been found that the high-velocity whirling flame actually scrubs the inner surface of the combustion tube and effectively reduces the accumulation of carbon, lead salts, and any other combustion products on the heating surfaces.

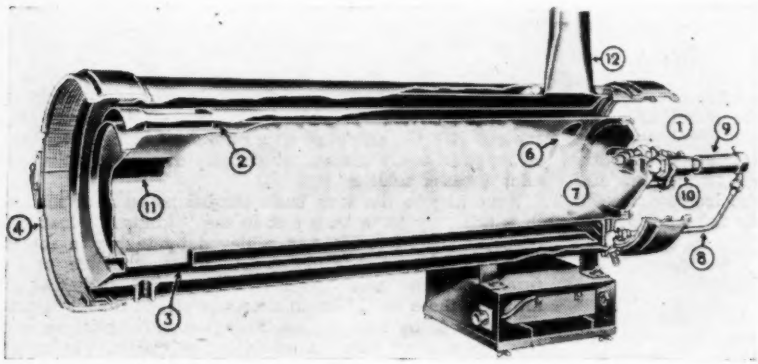
From Ground Level to Ceiling

High-altitude operation is maintained with this flexible, non-critical type of combustion. The proportion of combustion air may vary as much as 65 to 800 per cent. of the theoretical requirement and still maintain combustion, thanks to the differential air control, which varies in detail according to the type of aircraft to which the heater is fitted. The sylphon bellows control regulates the supply by opening the valve of the air scoop more and more as height is gained. When the aircraft is standing on the ground, there is, of course, no air being scooped in, and so a fan is provided for supplying the necessary air if it is desired to keep the heater going in order to prevent frosting of windscreens and to keep the cabin or crew's quarters warm before take-off.

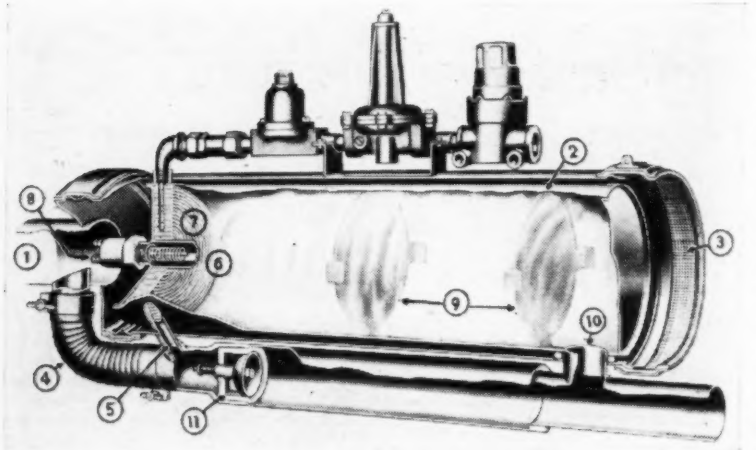
Extensive tests have been made in high-altitude chambers, and it has been found from these that the heater will operate from ground level to the low densities at 50,000ft. or more. Actual flight tests have been made up to heights of 37,500ft.

The velocity of the air through the heater is of the order of 5,000 ft./min. A portion of the air is taken for combustion. The remainder is passed over the heat exchanger, heated and distributed through ducts. This provides a quick distribution of a large quantity of hot air and ventilates the cabin. It also helps to keep the temperature of the casing low, so that the heater can be installed in confined spaces without risk. This fact makes possible the use of several heater units in different parts of the aircraft. Factors which further contribute to safety are: an oversize heater exhaust relieves any sudden pressures created; ventilating air pressure through the heater is always substantially greater than the combustion pressure inside the combustion chamber; the design prevents combustion gases from entering the aircraft even if the heater has been severely punctured.

Two basic methods are employed for mixing the air with the petrol for combustion, and the following descriptions of two typical units will therefore explain the difference in operation. The two types are known respectively as the V-type and the S-type.



An S-type "Janitrol" heater of 100,000 B.T.U. capacity. It employs a spray-type pressure burner using fuel under positive pressure. For explanation of reference numbers see text.



A V-type heater of 15,000 B.T.U. capacity. This model employs gravity fuel feed or high pressures from the aircraft fuel system. Reference numbers explained in text.

Gravity Feed

The V-type, with a capacity of 15,000 B.T.U., is designed for operation on gravity fuel feed, normally low pressures, or for high pressures obtained from the fuel pipes of the aircraft engines. In this type of heater the fuel is vaporised before being mixed with the air stream. At this point it is ignited by a low-voltage, glow-plug lighter. The functioning of this type of heater will be more easily understood by reference to the cut-away drawing. Air enters either through the air scoop or through an auxiliary motor-driven blower into the heater at 1, blankets the alloy combustion tube, 2, is heated and then discharged through the heated air outlet at 3 into the distribution system.

A portion of the incoming air required for combustion passes through the connector, 4, to the air-inlet nozzle 5, and into the combustion tube. As the air enters tangentially to the inner surface of the combustion tube, a whirling action is set up in the tube which picks up the vaporised fuel and forms a fuel-air mixture, 6.

Liquid fuel, at regulated pressure, is fed into the vaporiser, 7, which acts as an evaporating surface. The glow-plug, 8, both pre-heats and ignites the vapour. It is turned off automatically once combustion is established. It should be noted that the igniter coil is located outside of the high-temperature range. The flame whirls the full length of the combustion tube, with a travel many times the length of the

AIRCRAFT HEATING

tube. Two internal baffles, 9, on the 15,000 B.T.U. unit only, distribute the heat evenly.

As the burned gases reach the end of the combustion tube, they are expelled through an exhaust opening, 10, and pass overboard at a point of zero or even negative pressure on the aircraft. When the combustion air pressure is in excess of that required, the spring-loaded valve, 11, opens to bypass the excess air into the exhaust-gas outlet, 10.

The S-type heater chosen to illustrate the alternative system is of 100,000 B.T.U. capacity. Suitable for high or low-altitude aircraft, it is basically similar to the V-type except that it is equipped with spray-type pressure burners using fuel under positive pressure and incorporating additional heat-exchanger surface.

In this type of heater either glow-plug or sparking plug ignition can be used. For altitudes below 20,000ft. the sparking plug furnishes a rapid ignition system and one which lends itself to thermostatic control. The basic control is a simple hand switch. With spark ignition (which gives rapid lighting) combined with automatic temperature control, a double cycle from "off" to "on" and "off" to "on" again can be accomplished within a few seconds. The controls can be either of the "on-off" or the "high-low-off" type. The spark coil is screened to eliminate radio interference.

Turning more specifically to the 100,000 B.T.U. S-type, and to the part-sectioned view of it, ventilating air enters into the heater at 1, through the air scoop or the blower, as the case may be, or a combination of the two. It blankets the alloy combustion tube, 2, and heat exchanger, 3, is heated and is discharged through the heated-air outlet at 4 into the distributing system.

A portion of the incoming air passes through the connector to the air-inlet nozzle, 6, and into the combustion chamber, 2. As the air enters tangentially to the inner surface of the combustion chamber, a swirling action is set up in the tube; it picks up the vaporised fuel and forms with it a fuel-air mixture, 7. Liquid fuel at approximately 15 lb./sq. in. pressure enters through the fuel pipe, 8, through the pre-heater 9, and through the screen and spray nozzle 10. As burned gases reach the end of the tube, they enter the secondary heat exchanger, 3, through equally-spaced openings, 11. The hot gases circulate back through the heat exchanger and are exhausted through the flue opening 12.

Bomber Command's 12th V.C.

The King has been graciously pleased to confer the VICTORIA CROSS on Wing Cdr. Geoffrey Leonard Cheshire, D.S.O., D.F.C., R.A.F.V.R., 617 Squadron, in recognition of most conspicuous bravery. The official citation reads:—

THIS officer began his operational career in June, 1940. Against strongly defended targets he soon displayed the courage and determination of an exceptional leader. He was always ready to accept extra risks to ensure success. Defying the formidable Ruhr defences, he frequently released his bombs from below 2,000ft. Over Cologne in November, 1940, a shell burst inside his aircraft, blowing out one side and starting a fire; undeterred, he went on to bomb his target. About this time he carried out a number of convoy patrols.

At the end of his first tour of operational duty in January, 1941, he immediately volunteered for a second. Again he pressed home his attacks with the utmost gallantry. Berlin, Bremen, Cologne, Duisburg, Essen and Kiel were among the heavily defended targets which he attacked. When he was posted for instructional duties in January, 1942, he undertook four more operational missions.

He started a third operational tour in August, 1942, when he was given command of a squadron. He led the squadron with outstanding skill on a number of missions before being appointed in March, 1943, as a station commander.

Wing Cdr. G. L. Cheshire V.C., D.S.O. and Two Bars, D.F.C., R.A.F.V.R.

In October, 1943, he undertook a fourth operational tour, relinquishing the rank of Group Captain at his own request so that he could again take part in operations. He immediately set to work as the pioneer of a new method of marking enemy targets involving very low flying. In June, 1944, when marking a target in the harbour at Le Havre in broad daylight and without cloud cover, he dived well below the range of the light batteries before releasing his marker-bombs, and he came very near to being destroyed by the strong barrage which concentrated on him.

During his fourth tour which ended in July, 1944, Wing Cdr. Cheshire led his squadron personally on every occasion, always undertaking the most dangerous and difficult task of marking the target alone from a low level.

Wing Cdr. Cheshire's cold and calculated acceptance of risks is exemplified by his conduct in an attack on Munich in April, 1944. This was an experimental attack to test out the new method of target marking at low level against a heavily defended target situated deep in Reich territory. Munich was selected, at Wing Cdr. Cheshire's request, because of the formidable nature of its light anti-aircraft and searchlight defences.

He was obliged to follow, in bad weather, a direct route which took him over the defences of Augsburg and thereafter he was continuously under fire. As he reached the target, flares were being released by our high-flying aircraft. He was illuminated from above and below. All guns within range opened fire on him. Diving to 7ooft. he dropped his markers with great precision and began to climb away. So blinding were the searchlights that he almost lost control.

He then flew over the city at 1,000ft. to assess the accuracy of his work and direct other aircraft. His own was badly hit by shell fragments but he continued to fly over the target area until he was satisfied that he had done all in his power to ensure success.

Eventually, when he set course for base, the task of disengaging himself from the defences proved even more hazardous than the approach. For a full twelve minutes after leaving the target area he was under withering fire but he came safely through.

Wing Cdr. Cheshire has now completed a total of 100 missions. In four years of fighting against the bitterest opposition he has maintained a record of outstanding personal achievement, placing himself invariably in the forefront of the battle. What he did in the Munich operation was typical of the careful planning, brilliant execution and contempt for danger which has established for Wing Cdr. Cheshire a reputation second to none in Bomber Command.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers not necessarily for publication, must in all cases accompany letters.

THEORY OF FLIGHT

Nothing But a Headwind

IT seems to me, a layman prepared to be confounded, that R. H. Gardener (*Flight*, Sept. 7th) is asking: "Is there any difference in the way we walk when we walk (a) against the rotation of the earth, (b) across the rotation of the earth?"

Once an aircraft has absorbed the motion of the medium in which it is flying, there is no wind except that which it creates for itself.

I. R. LIDDELL, Capt., R.A.

CIVIL AIRCRAFT ENGINES

Relative Weights of Merlin and Hercules

WHILE I am not prepared to enter the air-cooled *versus* liquid-cooled controversy likely to be kindled by your contributors, Messrs. Potts and Pollitt, I feel that, in all fairness, Mr. Pollitt should have made reference, in his comparison of power plant weights (*Flight*, August 3rd) to the fact that, compared with the Merlin XX, the Hercules VI is an engine of considerably greater capacity with a b.h.p. output some 20 per cent. greater and, not unnaturally, with suitably heavier scantlings and equipment.

Incidentally, the Hercules VI weights quoted appear to err on the heavy side; for instance, although the Hercules with its auxiliary gear box provides generous accommodation for engine-driven aircraft accessories, I feel certain that this pioneer feature of the Bristol designs does not entail the approximately 50 per cent. weight penalty listed by your contributor.

"RECORDS."

Weight in Relation to Flight Time

IN his letter in *Flight*, Aug 31st, "Taxpayer" writes: "It used to be said before the war that the combined weight of engine and fuel was such that the diesel would not begin to pay until flights of some ten hours' duration were involved." Actually the time of flight could be much less, as the following comparative figures of the Guiberson A918 (250 h.p.) diesel engine and the average high-octane engine show. Weight in lb./h.p., 2.2 and 1.2. Fuel consumption in lb./h.p./hr., 0.34 and 0.5—the diesel weighing 1 lb./h.p. more and consuming 0.16 lb./h.p./hr. less.

Therefore flight time for diesel to equal petrol, weight for weight = total h.p. × 1 lb. ÷ total h.p. × 0.16 lb./h.p./hr. = 6¼ hours, the time being irrespective of total h.p., which cancels out.

Actually the above is a very conservative estimate. A much more encouraging figure is given by comparing the A918 with a petrol engine of similar power output. The average weight/h.p. of six different makes of aircraft petrol engines of approx. 250 h.p. is 2.02 lb./h.p., and the average fuel consumption 0.55 lb./h.p./hr. The above calculation then gives the attractive figure of a 0.86 hr. flight.

Besides the weight-saving that would be possible on a long-distance flight, a substantial saving in space would be possible due to the smaller volume of fuel required, a 10-hour flight on 4,000 h.p., saving approx. 110 cu. ft. (based on lower consumption difference).

Could any reader enlighten me as to the reason for the very limited use of the "park-bench" type of aileron as fitted to wings with full-span flaps several years ago? According to one source a machine so fitted—an American high-wing monoplane with Zap flaps—was reported to be quite pleasant to handle.

DONALD H. LORD.

AIRCRAFT ENGINEERING TRAINING

Unfortunate Attack on R.A.F. Syllabus

MAY I please be allowed to comment upon the letter from Mr. F. Ashley in your issue of August 3rd, 1944?

Are we expected to take seriously the statement that a fitter corporal, a Merlin expert with three years' experience, knew that the airscrew went round, but did not really understand it? I strongly suspect that the writer has either had his leg pulled or has fallen victim of the English genius for understatement, since it is obvious to everybody that with this alleged type of N.C.O. the Operational Commands would not be able to maintain their aircraft in a serviceable condition for one week.

Mr. Ashley's greatest criticism of R.A.F. training is "that they teach a smattering of many subjects and never get down thoroughly to one of them." Everything here depends upon what is meant by a "smattering," but if it means imparting only sufficient knowledge as is necessary for a tradesman efficiently and intelligently to cope with his duties, then I say that the R.A.F. is definitely on the right lines. There is no need for a flight mechanic (E) to have a thorough knowledge of heat engines, but it is essential that he shall possess a "smattering" of knowledge on aircraft engines, carburettors, magnetos, hydraulics, airscrews, etc., etc., sufficient to carry out his job of servicing engines and their ancillaries.

Again, why is the writer appalled at the general lack of machine shop experience, jig, and tool design and first-class workmanship? The R.A.F. trains such specialists as "machine tool setters and operators" to meet requirements, but the function of the ground staff is to service and repair aircraft, not to manufacture them. To say that the R.A.F. cannot produce highly-skilled tradesmen is absurd, and will be evident to anybody who has seen the test jobs completed by aircraft apprentices at the various stages of their training.

As regards theoretical training, this naturally varies from the very comprehensive course—which most certainly covers Theory of Flight and Charles' and Boyle's Laws—given to aircraft apprentices, down to the elementary instruction given to flight mechanics. I have no hesitation is stating that the standard of theoretical knowledge of the aircraft apprentices is much higher than that of the average highly skilled tradesmen in civil employment. Mr. Ashley considers that the original three-years' Halton course, improved in the light of modern improvement, is most necessary. He may rest content; the present apprentice syllabus conforms to his specification.

In conclusion I wish to say that I consider it unforunate that the writer could defend the S.B.A.C. proposals only by attacking the R.A.F. training. It is advisable to adopt this line of action when one has a poor case (a description by no means applicable to the S.B.A.C. proposals), and even then it is advisable to ensure that one's facts are correct.

F. J. P.

PRIVATE OWNERSHIP

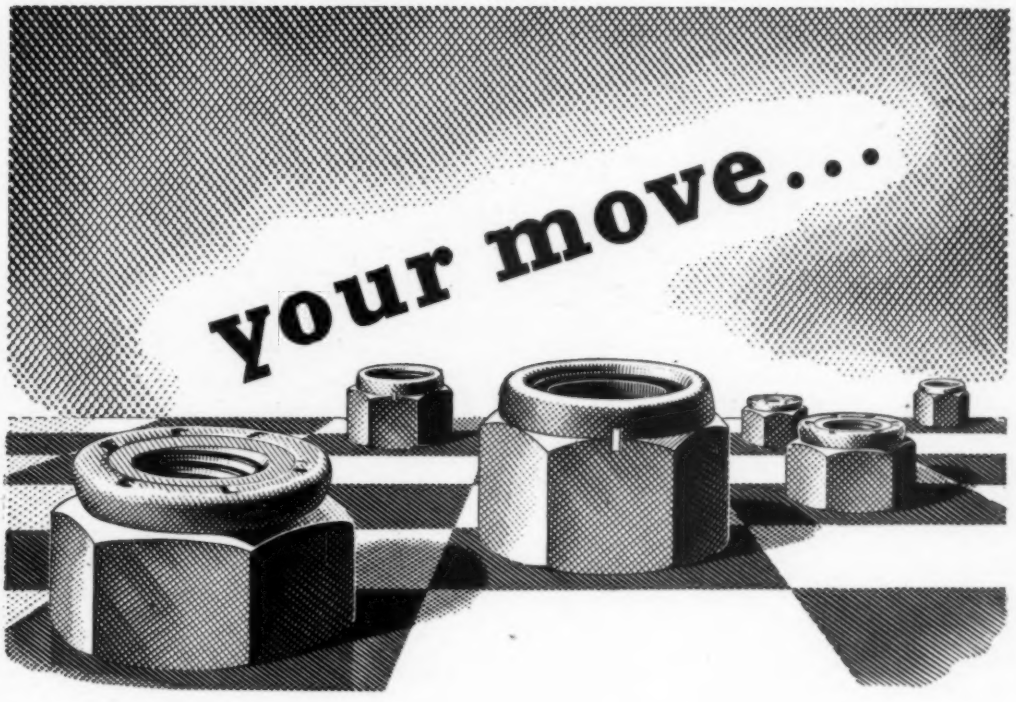
Support for "Indicator's" Views

I READ with much interest the article in the September 7th issue of *Flight* under the title "Private Ownership or Public Hire," and should like to make the following few brief remarks:—

Undoubtedly there will be a large number of persons with flying experience who will be desirous of continuing flying but who, unable to afford the upkeep and maintenance of their own private machines, would welcome a scheme whereby they could have the use of a machine at a reasonable rate of charge, provided it was suitably insured. At the same time the hirer would have to carry out a suitable test or tests to satisfy himself that the customer was a safe person to control an aircraft, especially if he were taking passengers.

While undoubtedly a large firm, with adequate financial resources, could give most excellent service in the way of supplying machines to suit all particular requirements, there is no reason why an equally good service should not be secured from the reputable local flying-school and club which is usually quite able to carry out an efficient hire service. In fact all flying-school and hiring concerns could combine together with a view to charging a flat rate for a specified type of machine, while at the same time an agreed arrangement could be arrived at in regard to the carrying out of repairs on machines landing for repair on respective hirers' airfields. In other words, a healthy partnership could be developed between the various local concerns, and in this way build up a good nucleus for the extension of connecting air services throughout the entire country. This would give the mass of the public the opportunity of air travel at low cost.

Undoubtedly each air hire service would have to include a car hire service if it were to be of real service to the community and the development of air travel. Perhaps it would be possible to include an all-in flat rate when a party hired an



"These metal diaphragm nuts seem pretty good. Better in some ways than the fibre collar. But, of course, they may prove a pig in a poke. And millions of the good old Simmonds Nut have been giving faithful service for years past. Perhaps the Simmonds Nut is safer."

Just a moment, you're the designer, of course, and you'll have to decide. But we should like to put a word in. We can only speak for ourselves, but *our* metal diaphragm Stop Nut — the Pinnacle — is no pig in a poke. We foresaw the possibilities of the metal diaphragm nut years ago. The Pinnacle is the result. It is a tried and proved metal Stop Nut, better for some purposes than any fibre collar nut. That's why we spent 5 years developing it. As we said at the start, the choice is yours, and there is a good case for both types. But whether you choose a Simmonds Nut or a Pinnacle Nut you can be sure of one quality — it will do its job.

SIMMONDS STOP NUTS

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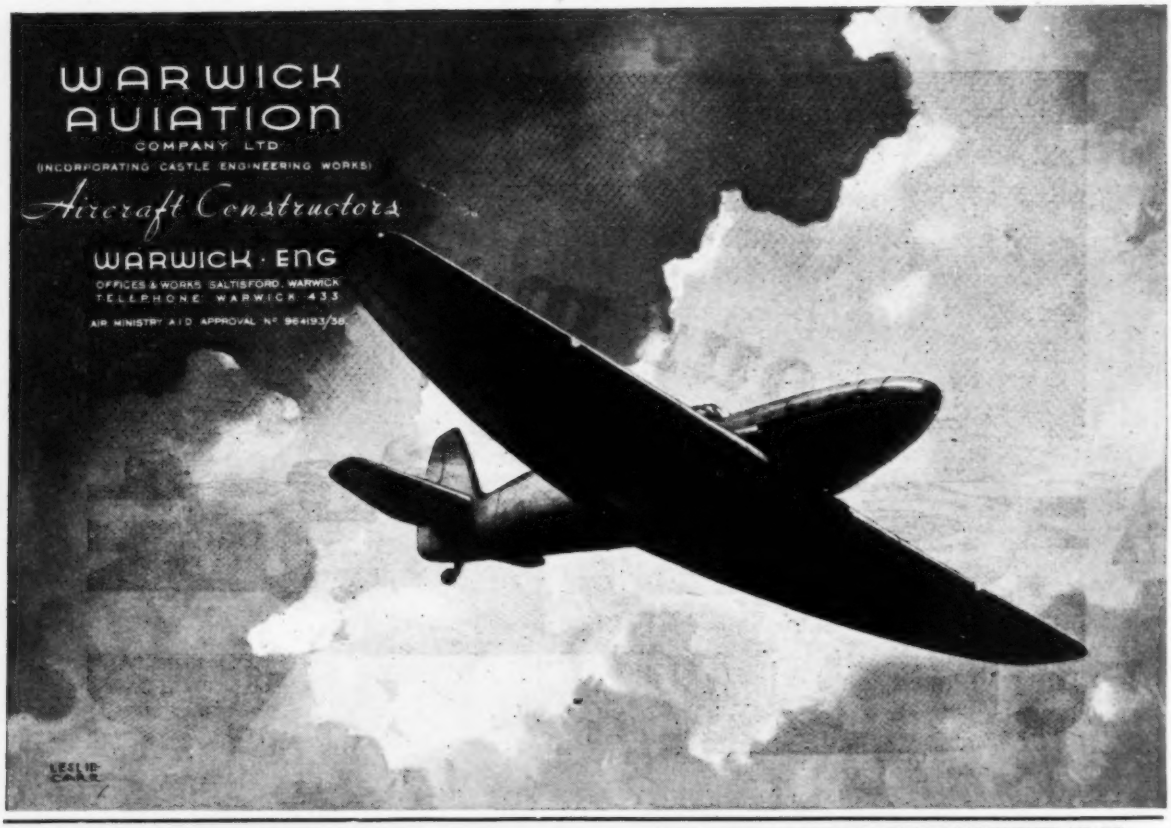


THE PROPHET

Before 1939 *General von Fritsch said:*

"The military organisation with the best photo reconnaissance will win the next war"

— with *Williamson Equipment*

WILLIAMSON MANUFACTURING CO., LTD.

Makers of Aircraft Cameras and Photographic Equipment of all types.

LONDON

CORRESPONDENCE

aircraft, so that he or she could be taken to and from the city or town served.

Such a scheme developed on the correct lines should go far to assist in the development of the social side of flying, as no doubt many customers would become members of the local flying clubs which in turn might hold "sporting events" in conjunction with car sporting events. Also it might lead to the development of air and combined road tours for tourists, thereby building up our tourist industry.

In fact the writer operated such a car and aircraft hire business as far back as 1934 but was unable to develop the aircraft side of it for lack of airfield facilities, which difficulty should be far removed in the coming post-war years. I shall certainly look forward to other readers' views on this important topic, but wish to add that I heartily endorse "Indicator's" views, and would be one prepared to co-operate in such a proposed scheme for the development of civil flying.

S. H. HANDASYDE.

No Subsidies or Government Control

I WAS very interested in your Leader and the article by "Indicator" on "Private Ownership or Public Hire" (*Flight*, Sept. 7th), because in 1914, if the war had not started, I would have started something on those lines. The Avro 504 was very suitable for the purpose and I was looking for an engine firm to take part in the scheme. However, the war stopped all that, and after three years I retired so as to get out to the Front, and nothing came of it.

You ask readers to contribute their views. "Indicator" has covered the ground so well that there is nothing much to say but to agree with him. He mentions subsidies in passing. I am against them. We built up the aircraft industry without them so there is no need for subsidies now. It is, of course, a different matter for the Reserve pilots and their refresher periods.

"Indicator" suggests that the Government might control his firm. NO! You want a body free to adapt itself quickly to altering conditions. For similar reasons I am rather against his Big-Business. I am in favour of competition every time; "Indicator" rather suggests it need not be "all-in-one-piece." I would favour each airfield having its one—or more—firms of hirers but all these firms all over the country working together, as he says, in healthy partnership.

It would be possible.

H. V. ROE.

Is the Outlook Really So Bad?

"INDICATOR" seems to me to write in pessimistic vein in *Flight* of September 7th.

As owner of a 130 h.p. Hornet (Gipsy Major engine), used mainly for Continental travelling, I found upkeep expenses light; petrol consumption, say, 6 gallons an hour for cruising speed, oil consumption low, hangar rent in Switzerland only 30 francs a month. Since I flew largely over and among mountains I had the engine "looked at" after every 20 hours instead of 25 hours as in England, but Swiss ground-engineers disposed of this job quickly and the craft was always at call. Though I kept no accounts, I should consider my general expenses as no more than those entailed by a small car. Leaving England in the morning I used to have tea at Geneva, Basle or Berne; and the next day perhaps I was over Mont Blanc having a ceiling sufficient for all Alpine sport, the most enthralling form of amusement which I know.

Now in 1939 there was an even simpler and more promising model being tried out for the amateur; I refer to the Moth Minor in its coupé form. This craft was very easy, I found, to fly and presumably inexpensive to maintain. Quite fast enough, too, for those who want to tour, and suitable for exploring mountains in the leisurely way required—petrol consumption, I believe, at about 4½ gallons an hour with Gipsy Minor engine.

But "Indicator" suggests that even this kind of machine invites establishment of a standard of State inspection which will have to be paid for heavily. Surely existing inspection, coupled with the annual refit, is ample for any well-made machine which is allowed to take the air at all. Don't let us multiply parasites in the shapes of officials paid just to harass our lives in the ugly serfdom of the modern State. Such inspection as is necessary is furnished by ground-engineers. My craft never needed more.

Far more important is an initial *adequate training* of the pilot, avoiding, thus, misuse of a craft. Given a good engine there's no excuse to be offered for most accidents occurring to the pleasure-craft of to-day. The game is not remotely as hazardous as, say, rock-climbing. No healthy man is too old for it.

A word of caution. In places like the English Channel definite routes of travel ought to be arranged for different craft, collisions between liners and joy-craft being possible in fog. But so far as may be, leave the joy-craft to themselves. Herbert Spencer's slave-world of socialism, into which the European modern state, created out of feudalism, threatens to grow, requires no special boosting on our part.

"FREE LANCE."

ENDURANCE AND RANGE

Method of Engine Control Advised

IN *Flight* of Aug. 24th, an article was published on Endurance and Range, by Sqn. Ldr. A. Sipowics, of the Polish Air Force.

In the third paragraph of the article the following words appear: "The pilot has however, to choose between two possibilities; either less boost and higher r.p.m. or lower r.p.m. and greater boost. These alternatives as a rule do not give the same power for the same speed because the efficiency of the airscrew is different in the two cases."

With reference to the crankshaft power, it is admittedly different in both cases. Surely to produce a definite reaction, such as a certain I.A.S. with a specified weight of aircraft, drag and altitude will require the same airscrew horse-power. This airscrew horse-power can be obtained in one of two ways, i.e., high r.p.m.—low boost, or low r.p.m.—high boost.

The crankshaft horse-power will be extremely high with the high r.p.m., but a very large percentage of this power will be absorbed in overcoming the mal-effects of the high r.p.m.

The obvious aim is to reduce fuel consumption to the absolute necessity for the requirements of flight. This can only be done by keeping the r.p.m. down to as low a figure as possible, with the highest boost obtainable at that r.p.m., the upper boost limit being the maximum economical cruising boost. The method usually advised is to retract the throttle lever to the E.C. boost position, and then to reduce the r.p.m. to obtain the desired I.A.S. The advantages derived from this method of engine control can be annotated as follows:—

1. The supercharger impeller is being driven at relatively low r.p.m. and consequently there is a reduction of the power required to drive it.
2. With the reduction of the rotational speed of the impeller there will be a reduction in the temperature rise of the fuel/air mixture passing through the impeller. This will increase the volumetric efficiency of the engine.
3. The power required to drive the ancillary engine equipment varies as the square of the r.p.m. Reduction of engine r.p.m. will reduce considerably the power required to drive the ancillaries.
4. High engine r.p.m. means excessive movement of the various working parts of the engine. This will give a sharp increase in the friction set up. Power must be absorbed in overcoming this friction.
5. There are other points which arise, all of benefit to the engine, such as lower bearing loads with a resultant increase in engine life; reduction of the amount of oil consumed; and finally from a psychological point of view, the lower r.p.m. will give a smoother running engine with increased comfort for the aircraft crew.

The conclusion that anyone would arrive at, on comparing the obvious advantages of low r.p.m. is that there is no choice of two possibilities. There is only one, the lower limit of the r.p.m. being governed by the limitations of the engine.

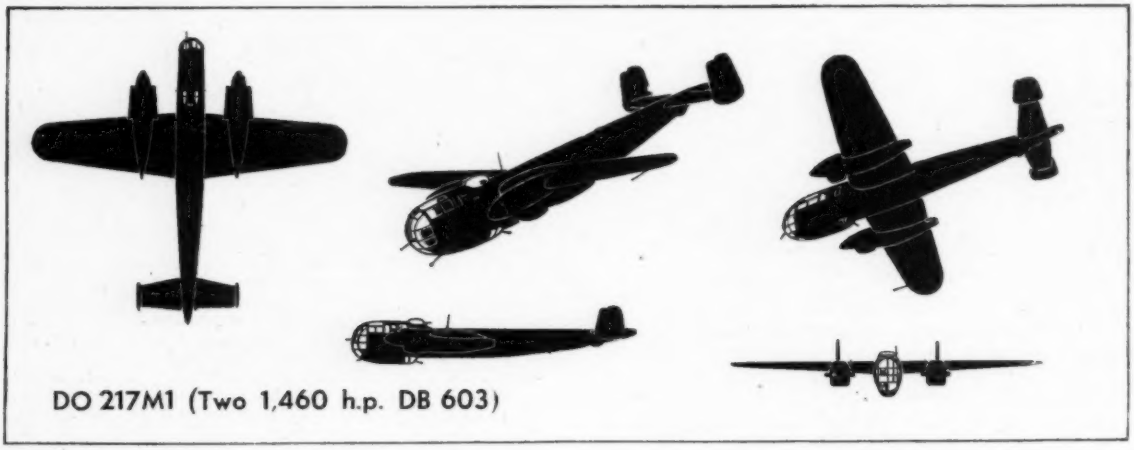
For a certain make of aircraft engine with, say, a 1,000 r.p.m. range of airscrew control, the difference in fuel consumption between the two extremes would be somewhere in the region of 10 gall./engine/hr. I have not made any mention of the possibilities of detonation occurring in the engine. With the wrong combination of r.p.m. and boost the possibility of this happening is very high.

With reference to the chapter on The Vector Diagram. Fig. 1 is said to represent a side-wind effect. The wind shown in this vector is not one which could be called a side wind. It is a three-quarter stern wind. A side wind blowing at 90 degrees to the line drawn between the starting point and the destination, will at all times be equivalent to a head wind. To proceed from point A in order to reach point B, under these conditions, the pilot would have to turn the head of the aircraft into the wind, with a resultant loss of ground speed.

RUPERT FORRESTER SIMMS.

Studies in Recognition

Aircraft in Flying Attitudes



DO 217M1 (Two 1,460 h.p. DB 603)

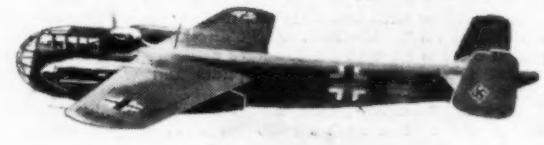
DEVELOPED from the earlier Do 17Z, the Dornier Do 217 first came into operational service with the *Luftwaffe* during 1941 as the Do 217E1 and E2, but numerous other versions have appeared at intervals since then, the latest known to be in service being the 217N, which is a night-fighter.

The two versions selected for comparison here are the 217E2 and the 217M1, both of which have been used in raids on this country. Two important differences will at once be noticed between the M series and the earlier E type, namely, the completely redesigned nose and cabin arrangement found on the 217M, and the fitting of 1,460 h.p. Mercedes-Benz DB 603 in-line liquid-cooled engines in place of the 1,580 h.p. BMW 801A air-cooled radial engines employed on the 217E versions. Actually, BMW radials are used to power all of the various models in the E, J and K series, only the M and N types being fitted with the Mercedes-Benz in-line power units.

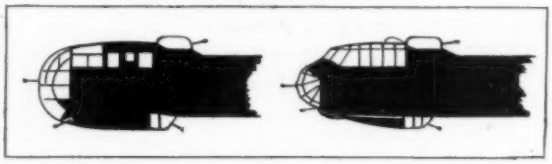
Although the M1 is 5in. greater in overall length than the E type, it may be taken, for recognition purposes, as identical in every respect to the E type except for the two differences already mentioned. The wings, tail unit and fuselage aft of the cabin are virtually the same on all Do 217s with the exception of the K2, which has high aspect-ratio wings of some 18ft. greater span and is designed to carry two special armour-piercing bombs on racks mounted below the centre-section, one on each side of the fuselage inboard of the engines.

Structural Differences

The adjacent nose silhouettes give a clear idea of the structural difference here between the later M1 type and the older 217E, which has previously been dealt with in this present recognition series. While the disposition of the armament has not been materially affected (and includes the power-operated gun-turret which distinguishes the E2 from the E1) it will be seen that the whole of the nose on the M type is glazed and, although decidedly bulbous, presents a better aerodynamic shape. This nose, by the way, is also employed on the 217K1 and 217K2. It is perhaps worth mentioning here that the E2, when first introduced, also had a unique form of dive-brake incorporated in an extension of the fuselage tail. This took the form of four flaps, radially disposed, which opened umbrella fashion against the airflow. The device was quickly detachable and was interchangeable with the normal fuselage extremity, but it evidently proved unsatisfactory for the idea was very soon abandoned—one may perhaps hazard a guess that it was prone to "abandon" the aircraft of its own accord when brought into operation. Be that as it may, all subsequent production E2 versions employed the more conventional kind of dive-brakes under the wings between the engine nacelles and the fuselage.



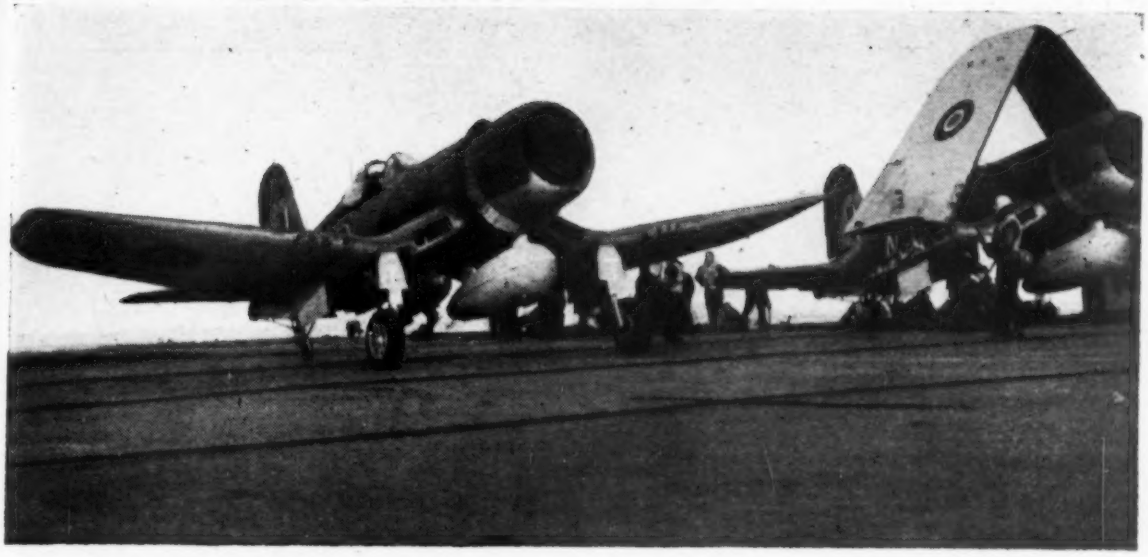
Dornier Do 217M1 Medium Bomber.



Do 217M1 Nose. Do 217E2 Nose

Dornier Do 217E2 Medium Bomber.

No spotter should have any difficulty in recognising nacelles which house in-line engines from those containing radial units except (as in case of certain Ju88s) when the former mount cylindrical nose radiators. In the case of the 217M1, the DB 603 engines are housed within typically in-line nacelles and have beard radiators. In both cases, however, the nacelles extent aft of the trailing edge, their extremities hinging down with the flaps. Dimensions of the Do 217M1 are:—Span 62ft. 5in., length 56ft. 10in., wing area 610 sq. ft.



Instead of the more usual wing and fuselage rack arrangement, the Fleet Air Arm Corsairs carry both the long-range fue tanks and the bomb under the fuselage.

SERVICE AVIATION

Royal Air Force and Fleet Air Arm News and Announcements

Appointments

THE Air Ministry announces the following appointments:—

Air Comdre. G. S. HODSON, C.B.E., A.F.C., to be A.O.C. of a Group in Bomber Command and to be Acting Air Vice-Marshal.

Air Comdre. T. G. BOWLER, C.B.E., to be A.O.C. of a Wing in Maintenance Command.

Air Comdre. W. J. B. CURTIS, C.B.E., to be A.O.C. of a Wing in Maintenance Command.

Group Capt. E. R. PEARCE, O.B.E., to be M.A.P. Representative in Australia and to be Acting Air Commodore.

Group Capt. S. C. ELWORTHY, D.S.O., D.F.C., A.F.C., to be Senior Air Staff Officer of a Bomber Group and to be Acting Air Commodore.

Group Capt. R. F. OSBORNE to be a Director of Equipment and to be Acting Air Commodore.

Air Vice-Marshal Hodson has been a Base Commander since April this year, having previously been in command of a station from June, 1943. He was awarded the A.F.C. and the Belgian Croix de Guerre in 1919 and the C.B.E. (Mil.) in 1942.

Air Commodore Bowler has been a Director of Equipment since May, 1942, having previously been at the Directorate of Equipment from April, 1938. He was commissioned in the 5th Batt. Dorset Regiment in August, 1914, and transferred to the Royal Flying Corps in 1917. He was attached to a Balloon Wing in the last war and has since been engaged on stores and equipment duties at R.A.F. Home and Middle East establishments. He is a graduate of the R.A.F. staff college. He was mentioned in despatches in January, 1916, and received the C.B.E. in June, 1944.

Air Commodore Curtis has been a Director of Equipment since March, 1940, having previously been a Deputy Director of Equipment from August, 1938. After five years' Territorial Service he joined the Royal Flying Corps as an air mechanic in August, 1914, being commissioned in April, 1915. He received the O.B.E. in January, 1919, and the C.B.E. in June, 1942.

Air Commodore Pearce has been at the Directorate of Production (Canadian and American Division) Ministry of Aircraft Production since April, 1941, having previously been attached to this Ministry, department of the Air Member for Development and Production, from August, 1940. He received the O.B.E. in July, 1940.

Air Commodore Elworthy has been Duty-Deputy, Supreme Command, Air Staff at Bomber Command, since April last, having previously been employed on Operations room duties in that Command from October, 1941. Commissioned as a Pilot Officer in the R.A.F. in 1933, he was engaged on flying and operations duties until 1941. In January 1941, he was awarded the A.F.C. In March of that year he received the D.F.C., and in April the D.S.O. He has been mentioned in despatches three times.

Air Commodore Osborne has been a Deputy Director of Equipment since February, 1942, having previously served at Air H.Q. Iraq on Equipment Staff duties from March, 1941. He entered the Royal Naval Reserve as a Warrant Telegraphist in September, 1914, being commissioned in the R.A.F. in April, 1918. He went to Sevastopol in May, 1916, for special service on airship construction.

Awards

THE KING has been graciously pleased to approve the following awards in recognition of gallantry and devotion to duty in the execution of air operations.

Bar to Distinguished Service Order

Act. Group Capt. D. E. GILLAM, D.S.O., D.F.C., A.F.C., R.A.F.O.—Since being awarded the D.S.O. in 1941, this officer has completed a large number of operational sorties. He trained and formed the first Typhoon Fighter Wing and by his outstanding leadership and organising ability contributed in a large measure to the success this aircraft achieved on operations. He has led numerous bombing sorties, setting an example of skill and determination to achieve his objective which has been an inspiration to all.

Wing Cdr. R. P. BEAMONT, D.S.O., D.F.C.—This officer, by his exceptional skill, brilliant leadership and great drive, has quickly built up a fine fighting force whose notable successes are a splendid testimony to their efficiency and resolution. Within a short period recently, Wing Cdr. Beamont has destroyed two enemy aircraft and attacked numerous locomotives, barges and mechanical transport. His record is most impressive.

Distinguished Service Order

Sqn. Ldr. D. R. GIBBS, R.A.F.V.R., No. 82 Sqn.—Commencing operational flying in July, 1941, this officer has a fine record. He is an outstanding leader with great administrative ability, and it is largely owing to his untiring efforts and fine example that his squadron has attained such a high degree of efficiency. Sqn. Ldr. Gibbs has always pressed home his attacks with praiseworthy skill, courage and determination.

F/O. M. S. STRANGE, R.C.A.F., No. 427 (R.C.A.F.) Sqn.—This officer was the pilot of an aircraft detailed to attack a target in Northern France. When nearing the target the aircraft was attacked by a fighter. The starboard side of the fuselage was badly holed by the enemy's machine-gun fire, which also seriously damaged the starboard elevator. The dinghy was set on fire and petrol from one of the tanks which had been pierced caused the flames to burn fiercely. The rear gunner was wounded, but remained in his damaged turret to give directions to his pilot, F/O. Strange, who outmanœuvred the attacker and afterwards successfully bombed his objective. Soon afterwards another fighter was encountered, but once again F/O. Strange proved his skill and evaded the attacker and finally reached an airfield in this country where he effected a masterly landing. This officer displayed the highest standard of skill, courage and devotion to duty in the face of extremely difficult and dangerous circumstances.

Wing Cdr. G. R. A. McG. JOHNSTON, D.F.C., R.A.F.V.R.—Wing Cdr. Johnston is an outstanding leader, whose rare qualities of skill, bravery and devotion to duty have been well reflected in successes of the squadrons he commands which have, within a few months, destroyed 57 enemy aircraft and damaged many more. Within a short period Wing Cdr. Johnston himself has shot down four enemy aircraft. His example has inspired all.

Bar to Distinguished Flying Cross

Wing Cdr. R. M. NORTH, D.F.C., A.F.C., R.A.F.V.R.—Since being awarded the D.F.C., Wing Cdr. North has completed many sorties. He is a skilful and courageous pilot and under his leadership the squadron has attained an exceptionally high standard of efficiency.

Sqn. Ldr. A. F. CARLISLE, D.F.C., No. 88 Sqn.—On his first operational tour, Sqn. Ldr. Carlisle took part in many day and night intruder sorties and led a flight in a low-level attack on an important enemy target. Since continuing his operational flying he has completed a number of important missions with great success and by his accuracy, initiative and courage, he has inspired the utmost confidence in all who have flown with him.

Flt. Lt. P. C. COBLEY, D.F.C., R.A.F.V.R., No. 613 Sqn.—This officer has flown on a large number of sorties. He has twice been wounded, but his keenness for operational flying remains undiminished.

Distinguished Flying Cross

Wing Cdr. J. B. NICOLSON, V.C., R.A.F.O., No. 27 Sqn.

Wing Cdr. I. G. E. DALE, R.A.F., No. 21 Sqn.

Sqn. Ldr. A. C. HENDERSON, R.A.F.V.R., No. 487 Sqn. (N.Z.).

Sqn. Ldr. G. KERR, R.A.F.V.R., No. 42 Sqn.

Flt. Lt. C. H. P. BELL, R.A.F., No. 226 Sqn.

Flt. Lt. G. A. BUTLER, R.A.F.V.R., No. 60 Sqn.

Flt. Lt. D. W. CLARKE, R.A.F.V.R., No. 170 Sqn.

Flt. Lt. D. A. CLIFTON-MOGG, R.A.F.V.R., No. 168 Sqn.

Flt. Lt. J. L. EVANS, R.A.F., No. 98 Sqn.

Flt. Lt. J. A. G. JACKSON, R.A.F.V.R., No. 66 Sqn.

Flt. Lt. D. P. LAMP, R.A.F.V.R., No. 19 Sqn.

Flt. Lt. L. H. LAMBERT, R.A.F.V.R., No. 168 Sqn.

Flt. Lt. A. G. OLVER, R.A.F.V.R., No. 88 Sqn.

Flt. Lt. J. C. PEPPIATT, R.A.F.V.R., No. 88 Sqn.

Flt. Lt. C. J. F. M. PIKE, R.A.F.V.R., No. 140 Sqn.

Flt. Lt. P. A. STANFORD, R.A.F.V.R., No. 98 Sqn.

Distinguished Flying Medal

Flt. Sgt. P. C. Boon, R.A.F.V.R., No. 170 Sqn.
Flt. Sgt. J. H. Gibson, R.A.F.V.R., No. 177 Sqn.
Flt. Sgt. (now P/O.) W. T. Gregory, R.A.F.V.R., No. 277 Sqn.
Flt. Sgt. F. Lee, R.A.F.V.R., No. 681 Sqn.
Flt. Sgt. F. Wills, R.A.F.V.R., No. 684 Sqn.
Flt. Sgt. R. A. Dymott, R.A.F.V.R., No. 514 Sqn.
Flt. Sgt. C. J. Johnson, R.A.F.V.R., No. 514 Sqn.
Flt. Sgt. J. Poad, R.A.F.V.R., No. 514 Sqn.
Flt. Sgt. A. R. Woolsey, R.C.A.F., No. 429 (R.C.A.F.) Sqn.

THE KING has been graciously pleased to approve the following awards :—

Bar to Air Force Cross

Act. Sqn. Ldr. G. C. Webb, A.F.C., R.A.F.V.R.

Air Force Cross

Group Capt. H. Ford, R.A.F.
Act. Group Capt. D. O. Finlay, D.F.C., R.A.F.
Wing Cdrs. T. A. Jefferson, R.A.F.O.; A. R. Wright, D.F.C., R.A.F.
Act. Wing Cdrs. H. H. Burnell, R.A.F.O.; L. J. Dixon, R.A.F.O.; R. J. Hardy, D.F.C., R.A.F.V.R.; H. E. Hopkins, D.F.C., R.A.F.O.; D. S. Richardson, R.A.F.V.R.
Sqn. Ldrs. D. I. Benham, D.F.C., R.A.F.V.R.; B. F. Fitzgibbon, R.A.F.; R. B. Fleming, R.A.F.O.; F. J. French, D.F.C., R.A.F.V.R.; P. C. Hordern, R.A.F.O.; E. S. Kennedy, R.A.F.V.R.; C. G. B. McClure, R.A.F.O.; C. N. McVeigh, R.A.F.O.; W. E. G. Measures, R.A.F.; J. A. Millar, R.A.F.O.; H. I. Rust, R.A.F.O.; A. P. Smallman, D.S.O., R.A.F.V.R.; L. E. B. Stonhill, R.A.F.O.
Act. Sqn. Ldrs. L. D. Birkett, R.A.F.V.R.; R. W. Brown, R.A.F.; H. W. Burr, R.A.F.V.R.; W. R. Dibb, R.A.F.V.R.; J. R. Donald, R.A.F.V.R.; A. G. A. Fisher, R.A.F.V.R.; E. G. Fraser, M.V.O., R.A.F.; S. R. Hyland, R.A.F.; E. A. Hood, R.A.F.V.R.; V. Hughes, R.A.F.V.R.; M. Leyshon, R.A.F.V.R.; C. G. Loader, R.A.F.; C. J. Mackenzie, D.F.C., A.A.F.; J. C. Melvill, R.A.F.V.R.; F. M. Osborn, D.F.C., R.A.F.; R. P. Priest, R.A.F.O.; K. A. Russell, R.A.F.V.R.; R. C. E. Scott, R.A.F.; H. Shields, D.F.C.; D.F.M., R.A.F.; K. S. Stammers, D.F.C., D.F.M., R.A.F.V.R.; W. Vale, D.F.C., R.A.F.; T. S. Wade, D.F.C., R.A.F.V.R.; B. H. Williams, D.F.C., R.A.F.V.R.
Flt. Lts. V. J. D. Baker, R.A.F.V.R.; J. Buncingham, R.A.F.V.R.; R. L. Chidlaw-Roberts, M.C., R.A.F.V.R.; T. P. Cowsill, R.A.F.V.R.; R. B. Ferry, R.A.F.V.R.; A. J. Hartley, R.A.F.; J. H. W. Hill, R.A.F.V.R.; E. L. Killip, R.A.F.V.R.; H. Mitchell, A.F.M., R.A.F.O.; J. C. M. Mountford, R.A.F.; L. Norris, R.A.F.V.R.; E. W. Pearson, R.A.F.V.R.; K. W. T. Pugh, R.A.F.; O. E. Rotherham, R.A.F.V.R.; L. Shackman, R.A.F.V.R.; J. S. Sams, R.A.F.V.R.; G. F. H. Sayers, D.F.C., R.A.F.; B. C. Smith, R.A.F.V.R.; R. T. Stokes, R.A.F.V.R.; J. R. Vallance, R.A.F.V.R.; R. A. Whitehead, R.A.F.O.; J. Williams, R.A.F.V.R.; W. C. Wilson, R.A.F.V.R.; R. G. Woodcraft, R.A.F.
Act. Flt. Lts. F. A. Haden, R.A.F.V.R.; H. S. Newton, R.A.F.V.R.; E. Walker, R.A.F.V.R.; G. G. G. Walters, R.A.F.V.R.; F. B. R. Wilson, R.A.F.V.R.
F/Os G. E. Brown, R.A.F.V.R.; J. D. Christian, R.A.F.; R. Edmond, D.F.C., R.A.F.V.R.; A. H. Fernihough, R.A.F.V.R.; I. F. Glover, R.A.F.V.R.; J. A. Henderson, R.A.F.V.R.; R. C. Horn, R.A.F.V.R.; R. L. Jackson, R.A.F.V.R.; A. E. Jones, R.A.F.V.R.; H. F. Marks, R.A.F.V.R.; D. V. Steynor, R.A.F.V.R.; J. West, R.A.F.V.R.
P/O. H. E. Fryer, R.A.F.V.R.
W/Os H. H. Binns, R.A.F.; L. D. Eastment, R.A.F.; B. Pollard, R.A.F.; E. W. Warren, R.A.F.

Air Force Medal

Flt. Sgts. F. Barwise, R.A.F.V.R.; J. Bennett, R.A.F.V.R.; B. J. Chacksfield, R.A.F.; W. J. McE. Conley (now Pilot Officer), R.A.F.V.R.; S. F. Cooke, R.A.F.V.R.; J. B. Harrison, R.A.F.V.R.; J. Hickey, R.A.F.V.R.; E. Imison, R.A.F.V.R.; W. T. Aldridge, R.A.F.; E. N. Scott, R.A.F.; F. G. Tanner, R.A.F.; J. E. Tibbles, R.A.F.V.R.
Sgt. H. C. B. Bright, R.A.F.
Cpl. A. A. Morton, R.A.F.V.R.
Leading Aircraftmen R. R. Coull, R.A.F.V.R.; E. F. Gatehouse, R.A.F.V.R.; R. L. Jones, R.A.F.V.R.; J. R. Prentice, R.A.F.V.R.

Royal Australian Air Force

Air Force Cross

Act. Sqn. Ldr. J. Clark.
F/Os J. R. W. Christenson; L. L. Maundrell.
W/O. A. Cannavan.

Royal Canadian Air Force

Air Force Cross

Sqn. Ldr. R. F. Miller.
Flt. Lts. L. H. Warriner; G. G. Wright.
Act. Flt. Lts. C. K. Burlingham; R. E. Laird.
F/O. P. A. Mick.

Royal New Zealand Air Force

Air Force Cross

Act. Flt. Lt. A. P. Gainsford, D.F.C.
F/Os G. D. Hudson; D. D. Burdett.

South African Air Force

Air Force Cross

Maj. P. S. Joubert.
Capt. V. S. Muir.

THE KING has also been graciously pleased to approve the following awards, on the recommendation of the Governor-General of Australia :—

Air Force Cross

Wing Cdr. I. F. D'A. Rose.
Sqn. Ldrs. L. E. Brain; E. R. Griffith; W. G. Upjohn.
Flt. Lts. H. R. Bonython; W. McL. Dempster.

THE GAME BAG: Painting symbols on the envelope of a balloon which brought down flying-bombs on two successive days.

Roll of Honour

Casualty Communiqué No. 424.

THE Air Ministry regrets to announce the following casualties on various dates. The next of kin have been informed. Casualties "in action" are due to flying operations against the enemy; "on active service" includes ground casualties due to enemy action, non-operational flying casualties, fatal accidents and natural deaths.

Of the names in this list, 97 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

Killed in Action.—Sgt. J. R. Carr; Act. Sqn. Ldr. J. Niblett, D.F.C.; F/O. K. B. Robinson; Flt. Sgt. K. C. M. Taylor.

Previously Reported Missing, Believed Killed in Action, Now Presumed Killed in Action.—Sgt. J. Dawson; Sgt. W. H. Evans; Sgt. I. Jenkins; Sgt. A. W. F. Notman; Act. Sqn. Ldr. W. T. Page; Flt. Lt. R. W. Smith; Flt. Sgt. E. F. Taylor.

Previously Reported Missing, Now Presumed Killed in Action.—P/O. A. V. C. Barden; Sgt. R. C. V. Beck; Sgt. J. H. Bennett; W/O. I. H. Blackburn; Sgt. R. Boulton; Sgt. L. T. Brawn; Sgt. E. J. Bream; Flt. Lt. J. N. G. Bruce; Sgt. B. L. Bryant; Sgt. L. G. Burry; Sgt. J. T. Cawthorne; Sgt. A. B. Clark; P/O. D. Collins; Sgt. R. G. Collins; Sgt. R. H. Csamm; Sgt. R. J. Crummey; Sgt. G. N. Dodds; Sgt. T. A. C. Dorn; Sgt. A. R. Downes; Sgt. R. J. Drinkwater; Sgt. D. A. G. Edwards; Sgt. F. Eeles; Sgt. L. J. G. Field; Sgt. G. R. Ford; P/O. E. C. Harrill; P/O. R. F. Hayward; F/O. P. E. Henley; Sgt. F. W. Hucker; Sgt. S. J. Humphreys; F/O. B. James; Sgt. L. C. James; Sgt. J. King; Flt. Sgt. W. J. King; Sgt. R. E. Lewis; F/O. W. W. Locke; Wing Cdr. R. M. Longmore, O.B.E.; Sgt. E. McIntosh; Sgt. R. J. K. Machan; Flt. Sgt. G. W. Mayo; Sgt. R. C. Mitchell; Sgt. H. W. L. Muir; P/O. R. W. F. Munns; P/O. C. M. Murfitt; Sgt. P. J. P. Murphy; P/O. P. D. Murphy; Sgt. O. J. Overington; Flt. Sgt. A. E. Parsons; Sgt. J. P. Parsons; P/O. W. W. Pattinson; Flt. Sgt. J. E. Pendleton; Sgt. A. R. Preston; Flt. Sgt. J. A. Rodd; F/O. J. L. Shattock; Sgt. J. Snowden; Sgt. F. Southern; F/O. R. H. Stanwell; Sgt. J. C. B. Strang; F/O. J. Strickland; Sgt. A. D. Taylor; Flt. Sgt. W. H. Thompson; F/O. V. P. Upton; Sgt. H. B. Warren; Sgt. H. G. Williams.

Wounded or Injured in Action.—F/O. D. L. Groom; Sgt. A. MacLean.

Missing, Believed Killed in Action.—Sgt. R. H. Cozens; Sgt. A. R. Green; Flt. Lt. L. J. Greenhalgh; F/O. G. Hallows; Flt. Lt. S. J. Houlden; Sgt. J. Notley; Sgt. G. S. Pritchard; F/O. J. H. Ward.

Missing.—Sgt. G. R. Armstrong; Flt. Lt. C. J. K. Ash; Sgt. D. Asquith; Flt. Lt. L. R. Aust, D.F.C., D.F.M.; Sgt. D. Balmforth; Flt. Lt. T. N. W. Bissett; P/O. A. J. Boyle; Sgt. W. W. Bright; Sgt. R. H. Brough; Sgt. R. T. Brown; F/O. D. J. Bryant; Sgt. F. J. Carey; Sgt. T. Carr; Flt. Sgt. J. G. Chadwick; Sgt. W. S. Chapman; Flt. Lt. M. H. Carter; Sgt. R. C. J. Cheesman; W/Cdr. H. A. Corns; Act. Sqn. Ldr. G. Crawford, A.F.C., D.F.C.; Sgt. G. N. Cribbin; Sgt. A. R. Croft; F/O. R. I. H. Davies; Sgt. V. Davies; Sgt. E. A. Davis; Flt. Sgt. A. H. Dickel; Sgt. W. E. Dobson; Sgt. W. H. Egglestone; Sgt. P. C. Eldridge; Sgt. S. Flavell; Flt. Sgt. D. N. Flitton; Flt. Sgt. R. Fox; Sgt. D. E. Froggatt; P/O. A. T. Gardner; Flt. Lt. D. H. H. Gathercole, D.F.C.; Sgt. J. B. C. Gray; Sgt. S. S. Greenwood; P/O. B. W. Griggs; Sgt. R. D. Hales; Sgt. G. H. Hall; Sgt. G. F. Hancox; F/O. D. Hargreaves; Sgt. G. W. Haswell; Sgt. F. W. Herbert; Flt. Lt. F. Hill, O.B.E., D.F.C.; Sgt. F. W. Holroyd; P/O. T. W. Hope; Sgt. E. D. Horton; P/O. G. G. Houston; P/O. H. Hugill; Sgt. R. C. Hulme; Flt. Sgt. P. J. Hyland; Sgt. K. V. Jones; Flt. Sgt. O. Jones; Sgt. D. J. A. Kemp; Sgt. A. E. Lee; Sgt. J. J. Leishman; Sgt. A. F. J. Lilley; P/O. R. W. Lowrey; Sgt. A. Lyall; W/O. P. J. Lynes, D.F.M.; W/O. H. McIlaney; Sgt. A. McLaughlin; Flt. Lt. G. A. Marrows; P/O. R. J. Martin; P/O. D. C. H. Maxwell; Sgt. J. A. Mitchell; Flt. Sgt. H. A. Monsen-Elvik; Sgt. G. B. C. Moore; Sgt. S. E. Moss; F/O. W. Murphy; Flt. Sgt. A. D. Neish; W/O. W. B. Northall; Sgt. D. A. Page; F/O. F. Pegg; F/O. H. E. Pugsley; F/O. C. S. Purkis; P/O. R. R. Reed, D.S.O.; Sgt. P. L. Rees; F/O. H. Richardson, D.F.M.; Flt. Sgt. E. G. Rippingale; Sgt. J. H. Robson; Flt. Sgt. R. Scott; Sgt. W. F. Shead; Sgt. J. H. Sheehan; Sgt. H. A. Shephard; Flt. Sgt. D. J. Sims; Sgt. O. F. Sisley; F/O. J. G. Smith; Sgt. J. A. Snowdon; Sgt. R. Stoten; Flt. Sgt. G. H. Stromberg; W/O. L. J. W. Sutton; Sgt. S. T. Tanser; Sgt. H. Tatler; Sgt. A. Taylor; Sgt. D. R. Taylor; Sgt. J. Taylor; Flt. Sgt. L. Tidbury; Flt. Sgt. W. H. K. Trewin; P/O. O. J. Turner; Sgt. W. C. Vessey; Flt. Sgt. A. A. Waller; Sgt. W. D. Webster; W/O. A. H. Wettone; Sgt. N. G. Whitley; F/O. D. A. Wiener; P/O. R. E. N. Wood; Flt. Sgt. N. J. Woodcock; Sgt. R. J. Woosnam.

Killed on Active Service.—L.A/C. W. Aldcroft; Act. Flt. Lt. C. D. Beales; Sgt. A. Brown; Act. Flt. Lt. R. L. W. Cheek, D.S.O.; Sgt. R. Clark; L.A/C. J. W. Cottier; W/O. H. W. Fletcher; Cpl. A. J. W. Hopkins; Sgt. P. W. D. Kevern; Cpl. G. Laker; Flt. Sgt. P. Lane; P/O. I. D. MacKay; Sgt. D. H. Marshall; Sgt. R. Twaite; L.A/C. G. N. Weightman; Flt. Lt. A. T. Wickham, D.F.C.; Cpl. D. F. G. Wilder.

Previously Reported Missing, Believed Killed on Active Service, Now Presumed Killed on Active Service.—Sgt. C. J. Hole; Sgt. W. J. Sadler; Sgt. J. P. Taylor; Flt. Sgt. B. C. Woodroofe.

Wounded or Injured on Active Service.—Sgt. I. C. S. McIvor; L.A/C. A. G. Webber; L.A/C. R. T. Woodland.

Died on Active Service.—Sgt. W. T. Basham; L.A/C. C. Boyden; Sgt. H. F. Cowie; Act. Sqn. Ldr. T. C. F. Earp; Flt. Sgt. F. S. Hannam; Sgt. W. Harpur; L.A/C. D. O'Rourke; A/C.2 W. H. Roe; L.A/C. D. B. Thomson.

Previously Reported Missing, Now Reported Prisoner of War.—Sgt. F. T. Lewis; F/O. S. L. Page.

Royal Australian Air Force

Killed in Action.—Flt. Sgt. T. H. A. Mallick.

Previously Reported Missing, Believed Killed in Action, Now Presumed Killed in Action.—Flt. Sgt. W. R. Minter.

Previously Reported Missing, Now Presumed Killed in Action.—Flt. Sgt. G. S. Colless; Flt. Sgt. T. K. Forsyth; Flt. Sgt. J. P. Hall;

VIATION

F/O. C. C. Logan; W/O. H. A. Miller; P/O. L. J. Pringle; Flt. Sgt. B. F. Wilmot.

MISSING, BELIEVED KILLED IN ACTION.—Flt. Sgt. S. N. Kelly; W/O. C. H. Whyte.

MISSING.—Flt. Sgt. J. E. Armstrong; Flt. Sgt. R. J. Birtles; Flt. Sgt. S. L. Edwards; Flt. Lt. W. J. Esler; P/O. J. C. Fardon; P/O. D. A. Hayman; P/O. H. C. Jones; Flt. Sgt. G. H. Knight; W/O. G. W. Lieb; W/O. K. T. Millikan; Act. Sqn. Ldr. A. G. Oxlade; Flt. Sgt. A. W. Poyzer; F/O. E. E. Quinlan; Flt. Sgt. B. S. Richmond; F/O. A. E. Roberts; W/O. M. J. G. Schultz; Flt. Lt. D. Shanks; F/O. M. C. Short; F/O. P. J. R. Steele; W/O. G. J. Stokes; Flt. Sgt. J. J. J. Turner; Flt. Sgt. C. J. Watson; W/O. J. P. Whelan.

KILLED ON ACTIVE SERVICE.—Sgt. D. W. R. Dixon.

DIED ON ACTIVE SERVICE.—P/O. H. M. Radcliffe.

Royal Canadian Air Force

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—F/O. G. L. Barker; F/O. J. A. Belecky; Flt. Sgt. B. Buckley; Flt. Sgt. W. F. Enman; Sgt. B. W. Gavin; Flt. Sgt. N. G. G. Luther; F/O. E. B. McCutcheon; W/O. R. N. McLean; F/O. J. A. W. Melrose; W/O. H. A. Pennell; F/O. L. H. Walton.

MISSING, BELIEVED KILLED IN ACTION.—Flt. Sgt. W. J. Fullum.

MISSING.—F/O. E. Allen, D.F.C.; P/O. W. A. Bailey; Flt. Sgt. A. C. Beckett; F/O. D. G. Biggs; Sgt. E. P. Boutillier; P/O. G. W. Chambers; P/O. W. J. R. Charles; Sgt. A. P. Chawanski; W/O. D. Clark; F/O. J. A. Cole; Sgt. W. W. Crum; Flt. Sgt. D. E. Derbyshire; W/O. J. E. G. Desmarais; Sgt. R. Dodds; F/O. L. Gold; F/O. D. W. Goodwin; Sgt. T. C. Guy; Sgt. W. G. Harris; P/O. M. E. Hayward; F/O. C. R. Hoffman; F/O. J. Hong; Sgt. J. Hopper; P/O. J. A. Inverarity; W/O. J. G. Jacques; F/O. L. S. Kennedy; Flt. Sgt. S. Kuleski; Sgt. F. W. Layton; W/O. J. S. McWilliams; Flt. Sgt. T. J. Makepeace; F/O. W. H. Matthews; F/O. W. W. Mitchell; P/O. H. R. Moncrieff; P/O. C. E. G. Patterson; F/O. R. H. Rolph; Flt. Sgt. M. A. Saruk; P/O. W. H. Scott; F/O. E. G. Shepherd; Flt. Sgt. D. D. Skingle; F/O. E. C. Watson; Flt. Lt. J. W. Weis; F/O. C. E. Willis; Sgt. M. Wiwsianski; F/O. C. D. Woodley; F/O. O. Wright; P/O. C. B. Wyckoff.

Royal New Zealand Air Force

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Act. Flt. Lt. W. Y. McGregor, D.F.C.; Flt. Sgt. G. P. Sowerby.

MISSING.—Flt. Sgt. E. H. F. Atkinson; W/O. B. G. Barton; P/O. J. C. Chalmers; Flt. Lt. J. G. Clouston; F/O. D. S. Johnstone; Flt. Lt. G. M. Kennedy; W/O. R. A. O'Kane.

KILLED ON ACTIVE SERVICE.—Flt. Lt. C. W. Evans.

DIED ON ACTIVE SERVICE.—W/O. M. J. Murphy.

South African Air Force

KILLED IN ACTION.—Sgt. H. R. Harmer.

WOUNDED OR INJURED IN ACTION.—W/O. T. F. Wolhuter.

MISSING.—W/O. E. B. Chapman; Lt. H. F. Churchill; W/O. K. G. Howard.

Casualty Communiqué No. 425

Of the names in this list, 107 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—P/O. K. A. Bayliss; Sgt. C. O. Bevan; Flt. Lt. P. M. C. Hill; W/O. J. R. Kerr; Flt. Lt. S. D. Meadowcroft; P/O. L. J. Snow; Sgt. M. Vance; Sgt. S. R. Ward.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. T. A. Ashcroft; F/O. R. E. Baker; Sgt. D. Bartley; Sgt. C. N. Boutle; Sgt. R. J. Darby; F/O. R. V. Fisher; Sgt. A. N. Griffiths-Buchanan; W/O. J. G. Hay; Flt. Sgt. R. G. Howell; F/O. A. R. F. Jonas; P/O. R. N. Jones; Sgt. F. G. McVey; Sgt. C. A. Maskell; Sgt. G. Read; Sgt. A. W. Richardson; Sgt. B. Robinson; P/O. W. H. Scott; Flt. Sgt. S. Smith; F/O. B. Soulsby; Sgt. G. H. Styler.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. D. A. Adams; Flt. Sgt. R. P. Atkinson; Sgt. H. Austin; Sgt. S. G. Barlegs; Sgt. N. Beer; P/O. S. P. Benge; Sgt. S. G. Bennett; W/O. R. C. Besant; Sgt. J. S. Blyth; Sgt. A. C. Brand; Sgt. G. H. Brown; Sgt. A. Burgess; Flt. Sgt. R. Cole; Sgt. A. Cottereil; Sgt. R. Crofts; Sgt. F. Davies; Sgt. R. F. Devitt; Sgt. W. H. Duroe; Sgt. J. Eccles; Sgt. A. E. Edwards; Sgt. J. W. Emson; P/O. H. E. V. Gawler; Flt. Sgt. T. H. Gittins; Sgt. J. W. Grain; Sgt. D. W. Hadlow; Flt. Sgt. A. E. Hickerton; Sgt. O. W. D. Hodges; Flt. Sgt. W. P. Homersham; Flt. Sgt. D. J. Howlett; Flt. Sgt. J. K. Hughes; Sgt. A. L. Humble; Flt. Lt. C. D. Ince, D.F.C.; P/O. A. W. James; Sgt. R. Jobson; Sgt. R. Kemp Welch; Sgt. P. W. Kitchen;

FOR DIVE BOMBERS: Running armour-piercing bombs up to Fairey Barracudas for the attack on the German battleship *Tirpitz* in Alten Fjord.

Flt. Sgt. S. C. Langston; Sgt. G. McGregor; Flt. Sgt. R. McKillop; Sgt. H. Moorhouse; Sgt. R. P. M. Mullarkey; Sgt. B. O'Connell; Sgt. J. E. W. Pimm; P/O. H. C. G. Piper; Sgt. J. A. Pitt; F/O. E. D. Porter; Flt. Sgt. W. J. Preece; P/O. R. J. Quinn; Sgt. D. H. Reid; Flt. Sgt. J. K. Shewring; Sgt. E. S. Shrimpton; Flt. Sgt. J. S. Smith; F/O. S. D. Smith; Sgt. E. A. Steele; Act. W/O. R. Stevens; F/O. R. W. Tait; Sgt. A. Tasker; Sgt. N. Teasdale; Sgt. H. H. Thomas; Sgt. W. Tucker; Sgt. R. V. Vandy; P/O. W. S. Williams; Sgt. D. G. Yardley.

WOUNDED OR INJURED IN ACTION.—Flt. Sgt. I. Evans; Flt. Sgt. F. Lardner; Flt. Sgt. C. G. Tubbs.

DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—Sgt. T. Collin; Flt. Sgt. C. W. Lillico.

MISSING, BELIEVED KILLED IN ACTION.—Flt. Sgt. E. L. Bartley.

MISSING.—Flt. Sgt. R. H. Ames; Sgt. H. W. Aparicio; Sgt. J. T. Archer; Sgt. D. Askwith; Flt. Sgt. A. Banham; Sgt. T. Blacklock; Flt. Sgt. R. F. Boots; F/O. F. B. Brandwood; F/O. A. Browne; Flt. Sgt. E. Bryan; Sgt. C. I. D. Campbell; F/O. W. M. Chant; Sgt. H. J. Chatterton; F/O. C. D. Chirighin; Flt. Lt. C. Chrystall; F/O. B. A. Clack; P/O. D. R. Cooles; F/O. S. P. Cooper; Sgt. F. L. Corner; Sgt. L. P. Croom; P/O. R. C. A. Crouch; Sgt. W. N. Curruns; F/O. G. H. Dalton; Sgt. D. A. Dawson; W/O. J. Devlin; Sgt. J. G. Divers; Sgt. R. E. Dodson; Flt. Sgt. P. Duff; Sgt. J. K. Dunne; F/O. P. J. Edmonds; Sgt. R. Elcombe; F/O. C. E. Esam; Flt. Lt. R. W. Evans; Sgt. S. W. Fox; Sgt. G. V. Foyle; F/O. A. G. Franklin; Sgt. F. J. Franklin; Sgt. J. Fulton; Sgt. J. J. George; Sgt. E. G. Gilliatt; Sgt. R. Glass; Sgt. G. N. Glithero; Sgt J. W. Golder; Sgt. H. T. Gregory; Sgt. B. Griffiths; Flt. Sgt. D. Griffiths; P/O. C. R. Hanson; Sgt. A. C. Harding; Flt. Sgt. H. Harris; Sgt. F. Harrison; Sgt. G. W. Heaton; Sgt. L. W. Hillman; Sgt. J. C. Hocking; Sgt. A. A. Holmes; Sgt. R. Howe; Flt. Sgt. E. L. C. Howell; Sgt. J. Hughes; Sgt. A. W. Hunter; Flt. Sgt. W. H. Iball; P/O. A. J. Innes; Flt. Sgt. D. R. Jones; F/O. E. Jones; P/O. G. D. Jones; F/O. W. I. Jones; Sgt. G. E. King; Sgt. L. G. Knight; Flt. Sgt. V. Kumar; Sgt. T. Langan; Sgt. K. E. Laxton; Sgt. B. J. Lee; F/O. R. H. Long; Flt. Sgt. P. Long-Hartley; F/O. W. Lynam; Flt. Sgt. J. B. McKay; Sgt. F. L. McMahon; Sgt. J. Maguire; Sgt. C. E. Mayne; F/O. J. Miller; Sgt. H. L. Moore; Sgt. R. T. Muir; F/O. C. J. Niblett; Flt. Sgt. C. Nicolson; Sgt. G. O'Leary; Sgt. H. A. Osborn; Flt. Sgt. S. Parr; Sgt. R. H. Pizer; Sgt J. Porrelli; Sgt. E. F. Price; P/O. C. F. Prowles; Sgt. R. L. Puckett; Sgt. L. Rateliff; F/O. J. J. Read; F/O. D. G. Reich; W/O. M. C. Richards; Flt. Sgt. L. J. Robey; Sgt. N. C. V. Rooker; Flt. Sgt. W. Ross; Sgt. A. W. Ryder; Sgt. I. C. Seager; Flt. Lt. J. S. Slaney; P/O. J. Smith; Flt. Sgt. E. Squire; Sgt. E. E. Stapley; P/O. A. H. Stewart; Sgt. W. Stovold; Sgt. R. Surtees; F/O. C. D. Taylor; Sgt. S. Thompson; Flt. Sgt. W. F. Thompson; P/O. H. W. Thomson; Sgt. E. Tonge; Sgt. M. J. Treymayne; Sgt. D. G. Tustin; P/O. N. J. Tutt; Sgt. W. Wales; Sgt. R. Ward; P/O. M. G. M. Warren; Flt. Sgt. E. J. Waspe; Act. Flt. Sgt. J. E. Watts; F/O. J. M. Wesley; Flt. Sgt. C. J. Weston; Flt. Sgt. H. P. Whitehead; Sgt. G. R. Whittle; Sgt. M. Wigham; F/O. R. F. Wilden; Sgt. B. T. Williams; F/O. W. T. Williams; Sgt. K. B. Woodman.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—L.A/C. A. J. Baines; Cpl. W. V. Goodwin; Act. Flt. Sgt. E. A. Hannah; L.A/C. H. K. Harman; Cpl. H. H. Henley.

KILLED ON ACTIVE SERVICE.—Flt. Sgt. B. Bowker; Sgt. A. J. Collins; P/O. L. Dunkley; Sgt. D. Kelly; Sgt. R. Lewis; Flt. Lt. A. MacLean; Sgt. J. T. Shannon; F/O. G. Smith; Sgt. W. M. Stanger; Flt. Sgt. A. C. Steel; Sgt. J. S. Thomson.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. H. B. Annan; Sgt. W. E. Bowen; Sgt. W. Bridges; Sgt. L. Limbrick; Sgt. G. Lindon; F/O. J. H. Williams, D.F.C.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. F. J. Lucas.

WOUNDED OR INJURED ON ACTIVE SERVICE.—L.A/C. E. W. Harwood; Cpl. S. Linstead; F/O P. J. Spellman; L.A/C. L. Westwood.

DIED ON ACTIVE SERVICE.—L.A/C. W. H. Berry; L.A/C. P. A. Bristow; L.A/C. G. Jackson; A/C.2 G. W. Toye; A/C.2 T. J. F. Tyrrell.

Royal Australian Air Force

KILLED IN ACTION.—F/O. W. S. Brennan; F/O. K. A. Coombe; Flt. Sgt. R. G. Cottew; Flt. Sgt. S. W. Merrin; P/O. W. H. S. Toyne.

DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—P/O. H. A. W. Parkinson.

MISSING, BELIEVED KILLED IN ACTION.—Flt. Sgt. G. J. Howard; Flt. Sgt. S. V. Mackrell.

MISSING.—Flt. Sgt. G. A. Armstrong; Flt. Sgt. R. Beard; Flt. Sgt. S. K. Black; P/O. R. A. W. Blair; W/O. A. F. Campbell; Flt. Sgt. K. G. Coleman; Flt. Sgt. J. R. Cottle; Flt. Sgt. B. A. Croft; F/O. J. M. Date; Flt. Sgt. B. J. Dowling; Flt. Sgt. J. L. Gilbert; Flt. Sgt. P. B. Giles; W/O. J. W. Godfrey; Act. Flt. Lt. R. G. Godfrey; Flt. Sgt. J. B. De B. Griffith; Flt. Sgt. W. E. Heywood; Flt. Sgt. J. E. T. R. Kingham; P/O. F. J. Knight, D.S.O.; P/O. R. M. Marshall; Flt. Sgt. D. S. Mitchell; F/O. A. H. Morrison; W/O. J. P. O'Meara; Flt. Sgt. J. Oshlack; Flt. Sgt. W. R. Pearce; P/O. L. G. Pratt; Flt. Sgt. J. T. Ridgeway; Flt. Sgt. P. R. A. Robin; Flt. Sgt. I. H. Smith; Flt. Sgt. R. B. Spencer; P/O. J. A. Traill; Flt. Sgt. O. L. Tyte; Flt. Sgt. J. W. Van-Cooten.

Royal Canadian Air Force

KILLED IN ACTION.—F/O. T. H. Dibb; W/O. G. H. Murray.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—W/O. R. Cummings; F/O. P. J. McGarvey; Flt. Lt. A. Novick; W/O. E. J. Walters; F/O. G. H. Weeden.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. R. E. Adam; Flt. Sgt. T. W. J. Copeland; Flt. Sgt. J. W. Gillin; F/O. M. G. Hovinen; Flt. Sgt. J. W. Johnson; W/O. D. H. McConechy; Sgt. B. R. Riddell; P/O. L. C. Rowe; F/O. P. C. D. Russell; Flt. Sgt. B. M. Walls; Flt. Sgt. R. McG. Watts.

DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—F/O. J. E. Dye.

MISSING, BELIEVED KILLED IN ACTION.—F/O. C. B. Cohen.

MISSING.—W/O. J. W. Y. Bibeau; F/O. B. G. Black; F/O. R. D. Crone; F/O. E. O. Heyworth; Flt. Lt. J. Hodgson; Sgt. S. B. Jones; Flt. Sgt. D. F. McCorkle; P/O. C. P. McWilliams; F/O. C. G. Neville; W/O. J. O. Paige; F/O. H. G.

SERVICE AVIATION

Tackaberry; F/O. R. J. Tomlinson; Flt. Sgt. L. W. Toombs; P/O. A. J. S. Wright.

DIED ON ACTIVE SERVICE.—Cpl. H. C. Drummond; Sgt. R. E. Schott.

Royal New Zealand Air Force

MISSING, BELIEVED KILLED IN ACTION.—Flt. Sgt. S. D. Muir.

MISSING.—Flt. Sgt. R. D. E. Betley; Flt. Sgt. P. J. Cook; Flt. Sgt. G. E. J. Gardner; P/O. E. J. Goodyer; Flt. Sgt. L. E. Hale; P/O. F. S. Sewell; W/O. E. W. Toohey.

KILLED ON ACTIVE SERVICE.—F/O. R. D. Ferguson; W/O. J. R. Lloyd; W/O. C. C. Osborne; Flt. Sgt. O. G. Reed; Sgt. F. M. Robertson; Sgt. D. J. C. Roulston; F/O. W. A. Thompson.

South African Air Force

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—Flt. Sgt. M. J. Jonker.

MISSING.—Lt. J. G. Dewit; W/O. A. F. Kelland; Lt. H. C. Palmer.

KILLED ON ACTIVE SERVICE.—Lt. T. R. Gouldern; Capt. R. J. Malan; Lt. W. D. C. Smith.

Casualty Communiqué No. 426

Of the names in this list, 99 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—Sgt. J. Carter; Flt. Sgt. G. E. Chaplin; Sgt. J. J. Duffy; Sgt. T. D. Elliott; Sgt. T. R. Farley; Flt. Lt. J. P. Gondola; F/O. R. H. Graham; Sgt. J. W. Grainger; Sgt. N. M. Hannah; Sgt. F. N. Harder; Sgt. R. L. Hood; Sgt. E. B. Hopkinson; Sgt. H. H. T. James; P/O. C. R. King; Sgt. R. G. Lindsay; Act. Flt. Lt. P. F. Lockyer; Sgt. M. Munns; Sgt. N. Nicholson; F/O. W. T. Olyott; Flt. Sgt. H. Pritchard; Sgt. B. C. G. Robinson; Sgt. S. W. A. Rolph; Flt. Sgt. R. Sadler; Sgt. T. Snowball; Sgt. S. Sterry; Flt. Sgt. S. Wharton; Sgt. G. Wood; F/O. W. A. C. Yates; F/O. G. A. Young.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. H. Ackroyd; Flt. Lt. N. H. Carfoot; F/O. A. Wallace.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. J. B. Atkinson; F/O. R. O. Barker; Sgt. D. Barnes; Sgt. R. D. Binks; Flt. Sgt. P. Birch; Sgt. J. L. Bloxham; Sgt. E. G. Bull; Sgt. W. Burnell; Sgt. J. Cole; Flt. Lt. M. W. Colledge; P/O. G. L. Coxon, D.F.M.; Sgt. R. E. Daye; Sgt. H. R. Delahay; Sgt. D. Demaine; Sgt. F. W. Dock; Sgt. R. Downs; P/O. L. Eaude; P/O. C. Firth; Sgt. H. A. Freeman; Sgt. P. G. Furlong; P/O. T. H. Gill; Sgt. H. E. Greavison; Sgt. A. H. Green; Sgt. A. H. Greenwood; Sgt. R. C. Haigh; Sgt. J. Hallsworth; Flt. Sgt. J. S. Harries; Sgt. W. A. Heal; Sgt. J. C. Hick; Sgt. S. G. Hipperson; Sgt. J. L. Holding; Sgt. C. Hopkinson; Sgt. W. Howes; Sgt. T. Hoyle; Sgt. R. Hughes; Sgt. G. Inns; Sgt. M. Jones; Sgt. G. S. Kemp; Sgt. B. J. Kennell; Sgt. H. W. R. Kerslake; Sgt. A. L. King; Sgt. E. D. Kite; Act. W/O. O. Lambert; F/O. J. V. Linford; F/O. H. McGhie; Sgt. R. McKee; Sgt. H. McMullin; Sgt. M. McPherson; Sgt. A. W. Marsh; F/O. G. L. Marshall; Sgt. V. C. Moore; Sgt. R. E. Morley; Sgt. H. Napier; Sgt. A. G. Osborne; Sgt. F. D. Paddon; Sgt. D. F. P. Pape; Sgt. T. F. Pearman; Sgt. T. Pyle; Sgt. G. G. Read; F/O. J. A. Rodger; Sgt. K. Saville; Sgt. J. E. Shepherd; Sgt. F. C. Shergold; Flt. Sgt. L. E. Short; P/O B. C. Smith; Sgt. R. W. Spencer; Sgt. A. B. Taylor; Sgt. W. Turner; F/O. W. M. R. R. Urquhart; Sgt. S. A. Walter; Sgt. K. Watt; Act. Flt. Sgt. G. Wilson; F/O. F. G. Wodehouse; Sgt. E. J. Wright.

WOUNDED OR INJURED IN ACTION.—Sgt. P. G. Brown; Flt. Lt. F. C. Cryderman; Sgt. G. Hasson; Flt. Sgt. H. W. McCormick; P/O. R. M. Mallard.

DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—Sgt. W. Best; P/O. A. E. Williams.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. R. Carr; Sgt. R. A. Milligan; Sgt. E. H. Mills; P/O C. H. Quinton; F/O. B. G. Sheldon.

MISSING.—Sgt. A. H. Anderson; Sgt. K. R. Ansell; Sgt. W. L. Arnold; Sgt. W. B. Bishop; Flt. Sgt. J. G. S. Boanson; F/O. J. Bolton; F/O. S. A. Booker; Flt. Sgt. L. W. Bostridge; F/O. A. E. Bothwell; Sgt. G. W. Boundary; Sgt. E. E. Brett; Flt. Lt. V. G. Brewis; Sgt. P. F. Broadribb; Flt. Sgt. L. S. Bryan; Act. Sqn. Ldr. W. R. Butterfield, D.F.C.; Sgt. F. H. E. Buxton; Sgt. I. Campbell; Sgt. W. Charnock; Sgt. J. Clarke; Act. Flt. Lt. W. M. Conlon, D.F.C.; Sgt. J. Conway; Flt. Sgt. R. H. Cooper; Flt. Sgt. W. A. Crawford; Sgt. R. W. Davis; Sgt. R. G. Dennett; Flt. Sgt. A. T. Downing; Sgt. C. S. Drew; Sgt. G. M. Edwards; Flt. Sgt. W. H. Elsey; Sgt. P. F. Fairweather; Sgt. R. E. Fielder; F/O. J. D. F. Flannery; P/O. H. A. Foster; Sgt. J. L. Fyfe; Act. Flt. Sgt. L. E. Gibbs; Act. Flt. Lt. H. D. Gillis, D.F.C.; Flt. Sgt. P. C. Goddard; Sgt. T. Gould; Flt. Lt. F. Gribble; Sgt. A. C. Griffiths; Flt. Sgt. R. C. Guy; Sgt. E. R. Hall; Sgt. C. L. Hallett; Sgt. E. Healy; Flt. Sgt. H. Hepworth; Flt. Sgt. J. Hewitt; P/O. D. R. Hollingsworth; Flt. Sgt. S. Hope; Sgt. G. Humphreys; Flt. Sgt. A. W. Jackson; Sgt. J. E. Jennings; Flt. Sgt. R. R. Jones; Sgt. G. J. King; Sgt. G. J. Lamb-Shine; W/O. A. R. P. Larkins; Sgt. W. H. V. Leach; Sgt. A. W. Lewis; P/O. W. C. Lewis; Flt. Lt. D. A. Long; W/O. M. W. McCannell; Act. Flt. Lt. K. MacDonald; P/O. W. L. McGown; F/O. R. Matthews, D.F.C.; P/O. R. F. Maude; Flt. Sgt. G. O'V. Messam; Flt. Lt. L. Miller; Sgt. P. E. Millington; Sgt. T. A. Mitchell; Flt. Lt. J. E. Morriss; Act. Flt. Lt. P. J. Moyes; Sgt. P. Murphy; F/O. A. A. Murray; Sgt. H. Newton; Sgt. J. N. Osselton; Sgt. J. E. Parkinson; Sgt. K. Penton; P/O. L. Pooie; Flt. Sgt. A. R. Porter; P/O. G. C. Presland; F/O. J. B. Raine; Sgt. E. H. Reynolds; P/O. E. F. Richardson; Sqn. Ldr. D. G. Ross, D.F.C.; Flt. Sgt. J. J. Rowland; Sgt. A. Russell; Act. Sqn. Ldr. J. L. Shaw; Sgt. T. J. Sheridan; P/O. T. M. J. Shervington; Sgt. A. Small; Sgt A. L. Smith; Flt. Sgt. R. A. Sparkes; Sgt. P. Standley-Smith; Flt. Lt. H. Steere, D.F.C., D.F.M.; Sgt. R. Stewart; Sgt. E. F. Stokes; Sgt. R. D. J. Sutherland; F/O. R. W. Tovey; Sgt. A. M. C. Vine; Flt. Sgt. H. E. Whale; Sgt. E. Whitehead; Flt. Lt. A. Whitten-Brown; W/O. J. Williams; Sgt. W. E. Williams; Sgt. A. J. Wilmot; Sgt. J. Westwood; Act. Flt. Lt. D. T. Wood, D.F.C.; Sgt. W. E. Woodbine; Sgt. J. R. Woodcock; Flt. Sgt. F. G. Woods; Flt. Sgt. H. E. Wootton; Act. Sqn. Ldr. C. Wright, A.F.C.; F/O. S. F. Yardley.

KILLED ON ACTIVE SERVICE.—F/O. S. R. Bolter; Flt. Lt. P. M. Cadman, D.F.C.; Sgt. E. F. Chapman; Sgt. H. Fox; W/O. S. J. Gilbert; Sgt. D. J. Hutchison; F/O. J. T. Irwin; Sgt. R. H. Kilner; L.A/C. T. C. McGovern; Sgt. V. R. Potter; F/O. H. H. V. Roots; F/O. A. G. Russell; A/C.2 K. Smith; F/O. A. F. Tidmarsh, D.F.C.; Flt. Lt. P. H. Watson.

WOUNDED OR INJURED ON ACTIVE SERVICE.—Sgt. R. L. Watt.

DIED ON ACTIVE SERVICE.—L.A/C. T. Baker; L.A/C. G. W. Dean; L.A/C. F. P. Derby; Cpl. C. G. Dulgarn; Sgt. A. Elgy; A/C.2 C. R. Green; A/C.2 A. Harrison; L.A/C. W. H. Powick.

Women's Auxiliary Air Force

DIED ON ACTIVE SERVICE.—A/CW.2 T. J. Shoesmith.

Royal Australian Air Force

KILLED IN ACTION.—Flt. Sgt. C. P. Nallen.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. C. C. Atkin; Flt. Sgt. R. A. Gibbs; P/O. W. G. Hurle; Flt. Sgt. A. H. McDonald; P/O. F. E. Mathers; F/O. R. R. Swinson; Flt. Sgt. C. W. Taylor; Flt. Sgt. I. Treloar.

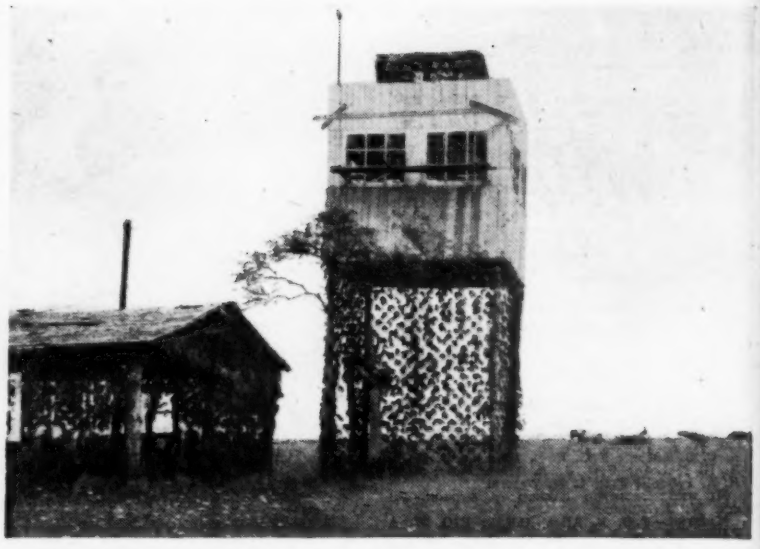
MISSING, BELIEVED KILLED IN ACTION.—P/O. A. L. Coates; Flt. Sgt. J. M. Craig; W/O. J. H. Pugh.

MISSING.—P/O. K. E. Bryan; P/O. A. N. Durham; F/O. K. W. Gale, D.F.C.; Flt. Sgt. V. N. Hansen; W/O. V. G. Kane; P/O. E. A. Law; Flt. Sgt. J. R. Nurse; W/O. C. A. Pickup; Flt. Sgt. G. Washbourne; Flt. Sgt. L. W. Zingelmann.

KILLED ON ACTIVE SERVICE.—Flt. Sgt. K. F. Galvin; P/O. G. L. Hyde; Flt. Sgt. A. Jordan.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Flt. Sgt. N. B. Munday.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Flt. Sgt. J. D. Krone.



MORE ERSATZ AIR FORCE : The control tower on a dummy German airfield in France. Everything had been laid out to the smallest detail. Dummy aircraft were at dispersal points.

Royal Canadian Air Force

KILLED IN ACTION.—F/O. L. R. Allman; F/O. F. A. Boyce; F/O. H. E. Jones; W/O. T. H. Schrump; Sgt. W. F. Smith; Flt. Sgt. J. M Stevenson.

MISSING, BELIEVED KILLED IN ACTION.—F/O. J. H. Clark; F/O. S. V. Garside; W/O. J. M. G. L. Lavoie; F/O. W. J. Mahagan; W/O. J. H. Munroe; W/O. D. J. E. Schmitz.

MISSING.—F/O. T. F. Barker; W/O. N. L. Berger; Flt. Lt. W. H. Brown; F/O. A. D. Callander; F/O. I. N. Caskey; Sqn. Ldr. G. E. Coldrey; Flt. Lt. W. J. Drope; Flt. Sgt. J. P. Duns; Sqn. Ldr. D. W. Farrell; F/O. L. C. Flather; W/O. J. D. Gallagher; F/O. M. H. W. Gee; F/O. J. K. Greenway; F/O. R. J. Grigg; P/O. C. J. Hall; Sgt. J. Hamilton; Sgt. A. McC. Hinds; Act. Sqn. Ldr. C. G. Hopton, D.F.C.; Sgt. H. C. Johnson; P/O. N. Johnston; F/O. W. P. Johnston; Sgt. D. A. Kelley; F/O. E. C. N. Kent; P/O. F. H. Lyne; W/O. L. A. McCrea; W/O. J. C. R. Maranda; P/O. N. Marshall; W/O. J. R. Mawhinney; Sgt. W. H. Moffat; W/O. W. H. Oakley; P/O. J. G. M. Renaud; Flt. Sgt. A. R. Smith; F/O. A. R. Taylor; P/O. R. B. Thompson; Flt. Lt. W. H. Way; Flt. Sgt. R. W. Westergard; Flt. Sgt. W. A. Younie.

WOUNDED OR INJURED IN ACTION.—W/O. C. Engelberg.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—F/O. K. E. Cooper; W/O. O. P. Yarnold.

Royal New Zealand Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—P/O. R. H. Fitzgibbon; W/O. W. J. Vocasivich.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—F/O. L. D. Glenday; Flt. Lt. W. D. Hawkins, D.F.C.; P/O. E. G. Little; Flt. Sgt. J. Pickett; Flt. Sgt. A. F. Rose; P/O. R. Rowe; P/O. R. J. Sim; F/O. H. I. Spiers; Flt. Sgt. H. G. Talbot.

South African Air Force

MISSING, BELIEVED KILLED IN ACTION.—Lt. E. Robarts.

MISSING.—Lt. A. G. Askew; 2/Lt. C. Campbell; Capt. V. B. Duckitt; Lt. L. C. Forsyth; Lt. S. E. Wentzel.